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ADDRESSES AND ORIGINAL ARTICLES

THE VALUE OF ALKALIS IN THE TREATMENT OF CHRONIC NEPHRITIS.

By A. Arnold Osman, D.S.C., M.R.C.P. Lond.,

CONSULTING PHYSICIAN TO GREENWICH AND DEPTFORD HOSPITAL; PHYSICIAN TO QUEEN MARY'S HOSPITAL, E.; AND SENIOR MEDICAL ASSISTANT, GUY'S HOSPITAL.

The object of this paper is to summarise the results of a method of treatment which has been used in certain types of chronic nephritis during the past seven years and to indicate, from the experience gained, in which cases and to what extent it is likely to prove of most value. The actual details of the method have been fully described elsewhere.[1]

It has been considered advisable to adopt the terminology usually employed in this country in the classification of the cases treated, rather than the more accurate and elaborate system of Volhard and Fahr. To avoid subsequent confusion it may be as well to explain concisely the actual terms used.

The cases have been divided into three main groups: (*a*) chronic parenchymatous, (*b*) chronic "mixed," and (*c*) chronic interstitial. Gross generalised œdema was the conspicuous and invariable feature of both the chronic parenchymatous and chronic "mixed" cases, the latter differing from the former in having also *at the time treatment was commenced* a considerable degree of nitrogen retention or azotæmia and often, in addition, marked cardiovascular changes. Chronic interstitial nephritis includes only cases which at the time of observation had nitrogen retention and cardiovascular changes but no œdema, though this may have been present in the earlier stages of the disease. The term chronic nephrosis has not been used, as it applies strictly to a very rare form of disease which can only be diagnosed with certainty on microscopical examination of sections of the kidneys. With this test most examples of chronic nephrosis, despite the requisite clinical and biochemical qualifications for inclusion in the group, subsequently turn out to be cases of chronic glomerular nephritis with maximal tubular changes. A few cases of acute parenchymatous or acute tubular nephritis are also included. A passing reference is also made to acute glomerular nephritis or acute nephritis with hæmaturia—terms which are self-explanatory—and subacute nephritis or cases of acute nephritis which are not clearing up satisfactorily and appear to be becoming chronic.

Alkalis may be used with advantage in many types of nephritis under certain circumstances, either for their prophylactic or their therapeutic value; the latter only will be discussed here. They should never be used except with some specific object in view. The frequent practice of giving "small" doses in the hope that they "might do some good" is bad medicine and should be condemned.

The protocols of the cases forming the basis of this paper will be published in detail elsewhere, but some of their main features have been incorporated in Table I. The cases included represent only a small proportion of those treated by this method and are, in fact, the first 40 so treated in which the history of the illness was long enough (seldom less than six months, and in one case as long as 14 years) to make spontaneous remission or improvement during treatment unlikely. With few exceptions, the symptoms were sufficiently severe to necessitate confinement to bed for at least three months before treatment was commenced. As will be seen from Table I., many of the cases had marked azotæmia and cardiovascular changes, and were therefore, of their type, severe and of long standing. Further, most of them had previously been treated by the usual methods—such as sweating, purgation, salt depletion, urea, high protein diets, thyroid extract, purine diuretics, or decapsulation—without conspicuous success. The ages of the patients ranged from 1 to 70 years, 16 being under 15 and 20 over 25 years of age. I have not included mild cases with only a short history of illness or those in which, for example, the amount of œdema was such as to permit of a little moderate exercise or walking, and in which the symptoms would in all probability have cleared up with any form of treatment or even spontaneously after a few weeks in bed. In such cases the administration of alkalis by mouth is so generally successful in hastening recovery that no detailed description is necessary.

This is well shown by the results of treating with alkalis the mild toxic tubular nephritis (or nephrosis) which so commonly accompanies, and is by some attributed to, hookworm disease, by others to malaria. The chief manifestations of this condition are gross generalised œdema, with ascites and oliguria, with considerable albuminuria and numerous casts, but no red blood cells in the urine and no azotæmia or cardiovascular changes. Treated in the usual way by diet and rest, the œdema and albuminuria as a rule subside in about 12 weeks, though residual albuminuria and relapses frequently occur. Drs. A. W. and J. N. Taves, of Rio Preto, N. Brazil, kindly undertook to try the effect of alkaline therapy in these cases, and found that the average time of recovery was reduced to six weeks, residual albuminuria and relapses being much less frequent.

The results of treatment in the present series have been judged chiefly by the effect produced on the immediate symptoms and the subsequent benefit to the patient. In chronic nephritis, where structural, progressive, and irremediable changes are so often present in the kidneys, the term "cure" cannot be applied legitimately to the disease, but it may be used for the permanent relief of a symptom such as œdema, which may in some cases—at least for a long time—constitute the chief or only disability. A good result may therefore justly be claimed on behalf of any method of treatment which relieves the sufferer of his chief symptom, prevents its recurrence, and permits a return to active life without serious inconvenience, if only for a time. The cure or relief, however, must have been effected within a period of time in which spontaneous remission or associated factors, such as confinement to bed, can reasonably be excluded as having produced the result. It must be remembered, too, that chronic nephritis is ultimately a fatal disease, except where intercurrent infection causes death, and even then it is almost certainly a contributory factor. These cases are essentially bad lives and bad material upon which to work. It follows that the remote prognosis is likely to be much the same whatever the nature of the treatment, when the latter is only symptomatic. With successful treatment, however, the capacity to lead a normal life may be recovered and maintained in place of an otherwise prolonged period of invalidism.

The mortality in the 40 cases of this series, in a period of five years, was 17, or 37 per cent., whilst in a group of the first 40 cases of as nearly the same types as could be found in the records over a similar period, treated by other methods, it was 19, or 43 per cent. The similarity in the mortality-rates of the two groups is interpreted as signifying that the cases selected for this review constitute a fair sample of severe types of chronic nephritis. It is clearly not

possible to assess with any accuracy the comparative merits of any one form of treatment in a disease such as chronic nephritis, owing to the enormous variations in type and in the stage in which the disease is presented for treatment. It is, however, possible to draw certain broad conclusions, and in doing so I hope that I have made no unjustifiable claims.

Treatment of Chronic Nephritis with Œdema.

Alkalis in small doses have long been used in cases of nephritis, generally with the rather vague intention of "flushing out" the kidneys. The use of comparatively large doses, given with the definite object of altering the reaction of the blood and tissues, came into vogue mainly as a result of the work of M. H. Fischer,[2] one of the first to appreciate the importance of physico-chemical principles as applied to the problems of everyday medicine.

The chief value of alkalis in the treatment of nephritis consists in their action in promoting diuresis and thus ridding the tissues of excess water or œdema. As might be expected, therefore, they have been found of most use in cases of chronic nephritis accompanied by considerable amounts of œdema and oliguria—i.e., in chronic parenchymatous and chronic "mixed" nephritis, where dropsy not due to an associated heart failure is the most prominent symptom. As some decrease in the plasma bicarbonate appears to be the rule in all types of chronic nephritis (84 per cent. in a recent series of 100 cases of all types[4]) it seems reasonable to suppose that alkalis, by increasing the blood bicarbonate might be of some value. It has also been found that if alkalis, in the form of equal parts of potassium citrate and sodium bicarbonate, are given by mouth, in amounts sufficient to raise the plasma bicarbonate to, and to maintain it at, a normal level under all circumstances of diet and exercise, it is often possible to induce a diuresis sufficient in degree and duration to rid the body entirely of œdema. If, after the œdema has subsided, the dose is readjusted to that which will, under the new conditions, maintain the plasma bicarbonate at a normal level, the œdema often does not return. In some cases, after an interval of freedom from œdema under this régime, it is possible gradually to diminish and ultimately to withdraw the alkalis altogether without a return of symptoms, but in others alkaline therapy should be continued indefinitely. Under the influence of alkalis albuminuria is almost always reduced—partly a dilution effect—and may disappear entirely. In view of the general belief that loss of albumin from the blood is an important factor in the production of œdema, it is interesting to note that Kempmann[3] has shown that, as the œdema associated with nephritis subsides under alkaline therapy, the protein concentration of the blood increases.

During treatment with alkalis it has usually been found that no dietetic restrictions of any kind need be imposed, and this in itself is probably of great value in a protracted case.[5] In none of the cases referred to here was any form of treatment other than alkalis employed. No doubt in the future better results may be obtained by a combination of various methods, but the object of the present investigation was to ascertain the limits of the alkaline method of treatment.

DISCUSSION OF RESULTS.

Of the 40 cases six were labelled acute parenchymatous nephritis—i.e., a tubular nephritis of comparatively short duration and unknown ætiology, with much œdema and albuminuria and no hæmaturia. The remaining cases were of the chronic parenchymatous or chronic "mixed" varieties, and all of them were suffering from marked œdema, which had been persistently present since the onset of the illness. Cases in which there was a history of spontaneous remission of the œdema have not been included. It will be seen from Table I. that in 36 of the 40 cases, or 90 per cent., a sufficient diuresis was produced and maintained to cause complete disappearance of the œdema. In four cases only did the treatment fail to influence the œdema at all (Nos. 15, 20, 37, and 38). Of the 36 cases in which the œdema disappeared under treatment, it recurred in four (Nos. 8, 12, 18, and 40), while active treatment was still being pursued. In these cases it was not found possible to maintain a sufficient diuresis for a long enough period to control the œdema. In 32 out of the 40 cases, therefore—i.e., in 80 per cent.—it was possible to obtain complete and lasting control over this symptom. The average period occupied by the treatment was six to eight weeks. It is at least apparent that alkalis used in sufficient doses and with proper care are among the most powerful diuretics known in cases of chronic nephritis with œdema.

The question arises whether the œdema can be prevented from returning for indefinite periods while the patient is leading a normal life on a normal diet. The following examples show that this can often be done. The correct dose of alkalis is apparently that which will maintain the plasma bicarbonate at a normal level under the conditions in which the patient is living. From time to time reassessment of the dose may be called for, according to any alterations in the habits or circumstances, in much the same way and generally for the same reasons as readjustment of dosage is required in diabetics under insulin—namely, with alteration in the diet or amount of exercise taken and during acute infections. For example, Case 1 continued to take alkali grs. 400 a day for five years without return of either œdema or albuminuria, and has continued her occupation as a school teacher during this period. Case 21 continued to take alkali grs. 300 a day for four years; Case 24 took grs. 600 a day for three years; Case 31 took grs. 600 a day for four years; Case 32 took grs. 600 a day for four years; Case 33 took grs. 700 a day for four years; and Case 36 took grs. 200 a day for 18 months. All these patients were able to return to work or to school for the periods mentioned, and any attempt at reducing the dose was invariably followed by a return of the œdema. From time to time such attempts were made, and experience showed that a reappearance of or increase in the albuminuria always heralded a return of the œdema.

This is well illustrated by Case 24. This child has a mother who is incapable of supervising treatment at home. On a daily dose of grs. 600 of alkali there was never any œdema, but during a period of four years she has relapsed six times, and has had to be readmitted to hospital each time with gross œdema and ascites. Each relapse was entirely due to slackness in taking the medicine. With the assistance of health visitors and the school authorities, however, it has been possible to prevent a return of symptoms during the past 18 months, and the child has been leading a normal life at home and at school, having all the time a full diet. When last seen (July, 1930) there was still no œdema, and the plasma bicarbonate was normal. There are other cases, such as Case 1, where it was found possible after a period of five years gradually to reduce and ultimately to omit the alkali without reappearance of symptoms. In some cases of chronic "mixed" nephritis, when the azotæmia had progressed to a considerable degree, the omission of the alkali was not followed by a return of the œdema as it had been previously. This was so in Cases 31 and 33.

TABLE I.

No.	Sex.	Age.	Type.	Probable duration.	Chief symptom.	Blood-urea mg. per cent.	Max. diuresis oz. p.d.	Total loss wt. lb.	Effect on œdema.	Remarks.
1	F.	19	C.P.	15 mos.	Anasarca and ascites.	37	..	..	Cleared up.	No œdema or albumin; back at work 6 yrs.; no alkalis 2 yrs.
2	M.	3	„	1 yr.	Anasarca and ascites; anuria 3 days.	—	70	10½	„	No œdema or albumin; no further treatment; well 1 yr. later.
3	M.	2	„	1 yr.	Anasarca and ascites.	—	..	3¾	„	No œdema or albumin, but died from ward epidemic of summer diarrhœa.
4	M.	26	C.M.	? 4 yrs.	Anasarca and ascites; b.p., 196; retinitis and amaurosis.	84	96	32	No œdema; alb. decreased 11 to 1·5 pts.	No œdema; up on full diet; died of convulsions; p.m., cerebral hæmorrhages.
5	M.	41	„	? 10 mos.	Swelling of face and legs.	82	..	6½	No œdema.	Albumin diminished from solid to 1·5 pts.; œdema returned; purpura; died.
6	M.	53	„	2 yrs.	Œdema legs, thighs and scrotum.	90	..*	..*	„	Died suddenly; coronary sclerosis.
7	F.	46	C.P.	? 6 mos.	Œdema face and legs.	42	..	9½	„	Not traced.
8	F.	24	„	? 6 yrs.	General anasarca.	31	..	14	Slight trace œdema.	Readmitted 9 mos. later in convulsions and coma; blood-urea, 80; died suddenly.
9	F.	19	C.M.	14 yrs.	Anasarca and ascites.	120	78	..	No œdema; alb., trace.	"Cold" in head; ? pneumonia; œdema returned; died.
10	F.	22	A.P.	? 3 mos.	Œdema face, legs, and thighs.	..	..	..	No œdema or alb.	Not traced.
11	F.	53	C.P.	1½ yrs.	Œdema face and legs; no ascites.	31	..	..	No œdema; alb., trace.	Discharged herself.
12	M.	23	„	1½ yrs.	Anasarca and ascites.	26	130	48½	Diminished, but still present.	Œdema controlled for a time, but later returned; died; no p.m.
13	M.	3	A.P.	1 mo.	Extreme anasarca and ascites.	..	..	..	No œdema or alb.	Died of pneumococcal peritonitis; p.m.: kidneys on section normal.
14	M.	41	C.M.	9 yrs.	Anasarca, ascites; b.p. 280/150.	33	190 circa	56	„	Died from erysipelas; no p.m.
15	M.	20	C.P.	3 mos.	Extreme anasarca and ascites.	40	90	Nil.	No result.	Died; ? pneumonia; no p.m.
16	M.	20	A.P.	2–3 mos.	Anasarca and ascites.	41	85	..	No œdema or alb.	Well 1 yr. later.
17	F.	28	C.P.	—	Anasarca, ascites, retinitis; b.p., 175.	..	100	..	Considerably reduced.	Coma; tetany; death; no p.m.
18	F.	4½	„	? 6 mos.	Anasarca and ascites.	67	61	18	Œdema cleared.	Œdema cleared up but returned and then not controlled; died; no p.m.
19	M.	2½	A.P.	? 3 mos.	Anasarca, anuria; no ascites.	..	74	..	No œdema or alb.	Treatment omitted; readmitted 1 month later; anasarca, ascites, anuria; died.
20	F.	4	C.P.	3 mos.	Anasarca, ascites; traces of blood in urine.	12	..	..	No result.	Died.
21	F.	56	C.M.	1 yr.	Œdema legs and thighs; retinitis; b.p., 140.	29	..	28	No œdema; some alb.	Blood-urea increased to 61 mg. per cent.; no œdema 3 yrs. later.
22	F.	36	„	5 yrs.	Anasarca; no ascites; retinitis; b.p., 170.	31	90	17	No œdema; alb., traces.	Readmitted 18 mos. later in coma; no œdema; b.p., 210/150; blood-urea, 102; died.
23	M.	17	„	1 yr.	Anasarca and ascites; b.p., 130.	120	134	21	Cleared up.	Alb. diminished to 2 pts.; well 8 mos. later; since untraced.
24	F.	5	C.P.	2 yrs.	Anasarca and ascites.	32	75	3½	„	Relapsed 6 times in 4 yrs.; each time cleared up with treatment.
25	F.	38	C.M.	4 yrs.	Œdema face and legs; b.p., 165/95.	50	..	3¾	„	Not traced.
26	M.	31	A.P.	2–3 mos.	Œdema legs, thighs, scrotum; ? asthma.	..	80	..	„	„ „
27	M.	42	C.P.	4 yrs.	Anasarca, ascites; b.p., 140.	..	124	18	„	—
28	M.	43	C.M.	? 6 mos.	Œdema legs and scrotum.	..	90	..	No œdema; alb., ¼ pt.	—
29	F.	9	C.P.	11 mos.	Anasarca and ascites.	..	..	..	Cleared up; alb., ¼ pt.	Died of pneumococcal peritonitis.
30	M.	6	„	6 mos.	Extreme anasarca and ascites.	44	44	11½	Cleared up.	No further treatment; well 5 yrs. later.
31	M.	13½	C.M.	10 yrs.	Œdema of face, legs, thighs; slight ascites.	39	87	6	Cleared up; alb., ¼ pt.	No œdema for 4 yrs.; blood-urea increasing.
32	M.	7	C.P.	8 mos.	Anasarca and ascites.	29	60	..	„	Remained free from œdema 4 yrs. under treatment; died pneumococcal peritonitis.
33	M.	20	C.M.	6 mos.	Œdema face, legs, thighs; no ascites.	35	..	16	Cleared up; alb., ¼ pt.	Remained free from œdema 4 yrs. under treatment; blood-urea increasing.
34	M.	28	„	10 mos.	Anasarca and ascites.	60	100	23½	Cleared up.	Readmitted 1 yr. later with uræmia; died.
35	F.	63	„	1 yr.	Anasarca; slight ascites.	80	150	..	„	Return of œdema; coma; death; no p.m.
36	M.	70	„	7 yrs.	Anasarca and extreme ascites.	80	160	56	Cleared up; tr. of alb.	Still free from œdema under treatment 1 yr. later; at home; full diet.
37	M.	28	„	2 yrs.	Anasarca and slight ascites 1 yr.	67	90	..	No result.	—
38	M.	5½	A.P.	? weeks.	Anasarca and ascites.	..	..	..	„	Tetany; dead.
39	F.	4	C.P.	1 yr.	Anasarca.	..	60	9	Cleared up.	—
40	M.	7	„	1 yr.	Anasarca and ascites.	..	..	..	„	Œdema twice returned and twice cleared up with treatment.

* Records missing.

A.C. = acute parenchymatous; C.P. = chronic parenchymatous; C.M. = chronic mixed nephritis.

The Dangers of Alkali Therapy.

It is not to be supposed that large doses of alkali can be given with impunity where the kidneys are badly damaged and, therefore, unable to excrete any excess. On the contrary, even under the most favourable conditions—as in hospital, where constant skilled supervision can be obtained and the means are at hand for immediate blood analyses—the danger of overdosage is always present and it may be precipitated by such accidents as intercurrent infection or vomiting from any cause. Treatment by this method, however, without the control of blood estimations, may give good results where other methods have failed, as shown by Ungley, Suzman, and Feggetter,[6] but all their cases were in hospital and were most carefully and constantly watched. Details of the particular dangers likely to be encountered and the means adopted in overcoming them have already been described.[1] Of these, tetany is the most important. Recent observations suggest that in the past undue caution has been exercised in the dosage of calcium used in counteracting this danger, and it is probable that, with a bolder use of calcium, tetany will cease to be a serious menace. No evidence has been obtained that the continued use of alkaline salts cause any damage to the renal cells, as suggested by Stieglitz.[7]

TABLE II.—*Deaths in Cases of Nephritis Whilst Under Treatment.*

Case No.	Type.	Probable cause of death.	Confirmed p.m.	Œdema at time of death.
4	C.M.	Cerebral hæmorrhage.	Yes.	Nil.
5	„	Uræmia. (Died at home.)	No.	+•
6	„	Coronary sclerosis.	Yes.	Nil.
8	C.P.	Uræmic convulsions. Sudden death.	„	+•
9	C.M.	Uræmic coma; pneumonia.	„	+•
12	C.P.	? Heart failure; ? pneumonia.	No.	+
15	„	? Pneumonia.	„	+
17	„	Tetany; coma.	„	+
18	„	? Cardiac failure.	„	+
19	A.P.	Anuria; vomiting; ? uræmia.	„	+
20	C.P.	? Relative suppression; ? heart failure.	„	+
22	C.M.	Uræmic coma and convulsions.	Yes.	+•
29	C.P.	Pneumococcal peritonitis.	„	+•
32	„	„	„	Nil.
34	C.M.	Uræmic coma.	No.	+
35	„	„	„	+
38	A.P.	Tetany; coma.	Yes.	+

• Terminal.

The causes of death in the present series are shown in Table II. A fatal result in many of the cases shown in Table I. was inevitable with any form of treatment. Case 17 was not seen by me; she was treated in another hospital without the control of blood examinations and the notes were forwarded later. It must be admitted that overdosage with alkalis was the immediate cause of death in Cases 17 and 38, and that it was a possible cause in Case 15. No other deaths from tetany due to over-alkalinisation have occurred in my experience.

Indications and Contra-indications.

Chronic nephritis with œdema.—Alkaline therapy is chiefly of value in the treatment of chronic nephritis for the production of diuresis and the dispersal of œdema. It must not be inferred, however, that the removal of œdema is either necessary or desirable in every case or at all stages of the disease in which it may occur. There are reasons for believing that in some cases and at certain times œdema subserves a protective function, possibly by the dilution of toxic or retained substances. In the absence of precise knowledge one can only be guided by clinical experience and a careful consideration of all the facts, paying special attention to the age and general condition of the patient and to the state of the cardiovascular system. It is obviously courting disaster to submit an elderly subject with irregular cardiac action to the strain involved in the removal of large quantities of œdema fluid, even when there are grounds for believing that the œdema is not cardiac in origin. Marked cardiac arrhythmia is probably a contra-indication to the use of large doses of alkalis in any type of case. A list is given below of what are considered to be the chief indications and contra-indications for the use of alkalis in the active treatment of the various types of nephritis. There is little doubt that with adequate facilities for the investigation of a sufficient number of cases of all types fairly simple means could be devised for determining beforehand the probable value of this form of treatment for a given case.

Chronic nephritis without œdema.—In this type of disease the plasma bicarbonate is, as a rule, lower than in the cases with œdema, even at a time when nitrogen and phosphate retention are not extreme. Although polyuria is also the rule in such cases, and the diuretic action of alkalis is therefore not called for, it is possible that alkalis in amounts sufficient to raise the plasma bicarbonate to normal are not without benefit. The evidence for this is admittedly weak, and may be mentioned briefly for what it is worth. Vague clinical impressions, both of a subjective and of an objective nature, are clearly inadmissible as evidence, and accurately controlled observations are much needed.

Weiss[8] has shown that alkalis are the most effective drugs in the treatment of the nephritis of bichloride of mercury poisoning, where œdema is not usually a prominent symptom. I have pointed out [5] the benefit of alkalis in permitting the use of a more liberal diet. The following experiment also suggests that alkaline therapy may not be without value in some cases of chronic interstitial nephritis.

In August, 1928, it was decided to observe the effect of omitting alkalis altogether in four cases where they had been given continuously for the preceding four years, in doses of from grs. 240 to 700 a day—i.e., doses which had been found to be sufficient to keep the plasma bicarbonate at a normal level while the patients were pursuing their usual avocations on a normal diet. The cases were Nos. 31, 32 and 33 in Table I., and a married woman, aged 56. They were all treated in the first instance for œdema, which had not recurred throughout the period of observation. In the course of time, however, the azotæmia had considerably increased in all the cases, so that by August, 1928, the blood-ureas were 210, 50, 220, and 80 mg. per 100 c.cm. respectively. None of the patients had up to this time shown any of the usual symptoms of grave uræmia—i.e., headaches, amaurosis, or convulsions—though Cases 31 and 33 were extremely anæmic. By December, 1928, all four cases had been admitted to hospital with urgent symptoms; Cases 31 and 33 in convulsions, Case 32 with gross œdema and ascites (pneumococcal peritonitis, from which he died), and the married woman with dyspnœa and œdema of the legs. It is possible, of course, that the results of this experiment were nothing more than a coincidence, though it is difficult to avoid the impression that the cases failed owing to the withdrawal of a support they had previously enjoyed.

It is of great importance to obtain further definite evidence upon this point, for if these observations should be confirmed it would be necessary to advocate the continuous use of adequate doses of alkalis in all cases of chronic nephritis, whether the patients are actually suffering from œdema or not. At present the evidence scarcely justifies such a course, though I am inclined to give the patient the benefit of the doubt where there are no obvious contra-indications and the plasma bicarbonate is below normal.

Summary.

In attempting to assess the advantages and disadvantages of this method of treatment compared with the others cited above, it is probably true to say that it is more effective in removing and preventing the recurrence of œdema in a larger proportion of cases. On the other hand, the necessity of giving comparatively large doses is attended by certain dangers and the need for the most constant supervision and occasional blood analyses. It is not, therefore, a suitable method for adoption where such facilities are not available, but it is frequently successful where other methods have failed. The more usual methods are all comparatively safe (except decapsulation) and can mostly be carried out without elaborate precautions or even much experience, but they are frequently ineffective. In cases with persistent œdema, alkaline therapy should not be attempted until other and simpler measures have failed and spontaneous recovery appears unlikely. It is a method of treatment which calls for considerable experience in management and a nice discrimination in the selection of cases.

Alkalis should only be used, except in rare instances,[1] where a preliminary estimation has shown a decrease in the plasma bicarbonate. They may often be used with advantage for the production of diuresis and the control of œdema in (*a*) chronic parenchymatous nephritis, (*b*) chronic "mixed" nephritis, (*c*) the late stages of acute parenchymatous nephritis, (*d*) the later stages of subacute nephritis with persistent œdema and without marked hæmaturia.

Alkalis should not be used, except in rare instances,[1] in the early stages of acute nephritis with hæmaturia —i.e., in (*a*) acute nephritis (acute hæmorrhagic or acute diffuse nephritis)* ; (*b*) during acute exacerbations (with hæmaturia) of chronic nephritis, unless controlled by estimations of the blood bicarbonate ; (*c*) in the presence of marked myocardial degeneration and cardiac arrhythmia ; (*d*) without a preliminary estimation of the blood bicarbonate when there is persistent vomiting or marked dyspnœa.

I should like to take this opportunity of thanking the many friends and colleagues who have assisted me from time to time in carrying out these investigations, and also those who have allowed me to treat cases under their care, particularly Drs. A. F. Hurst, A. P. Beddard, H. French, J. A. Ryle, C. Moffatt, C. C. Ungley, M. M. Suzman, J. J. Conybeare, A. C. Hampson, A. W. Taves, H. C. Cameron, and E. P. Poulton. I am greatly indebted to Dr. H. G. Close for performing many of the necessary biochemical investigations, and for help in many other ways. I am also indebted to Dr. J. H. Ryffel, the late Prof. Adrian Stokes, and Prof. R. Donaldson, of Guy's, and Dr. Arthur Davies, of Queen Mary's, for kindly placing at my disposal the necessary laboratory facilities, and to the authorities at Guy's Hospital for providing me with a special out-patient clinic for the upervision and following up of these cases. Finally, my thanks are due to the Medical Research Council for the aid of a grant enabling me to carry out this work.

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* Alkali administration, as a matter of fact, will often hasten recovery in acute nephritis with hæmaturia, but as the majority of these cases clear up satisfactorily without special treatment it is considered unwise to advocate the routine use of this method (even though the dangers of doing so are largely hypothetical) until more precise indications for their use in such cases have been worked out.

BURNS AND SCALDS.

AN ANALYSIS OF THE CHANGING INCIDENCE AND MORTALITY.

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Hospital registers throw no little light upon the order of social as well as of medical progress. Upon their pages certain morbid conditions dwindle fast in number from year to year. Chlorosis, lead-poisoning, rickets, and certain fevers have come to be regarded as "disappearing diseases." If burns and scalds have hardly earned the title of "disappearing accidents" there has nevertheless been a great reduction in their number and severity during the present century. Although such a change for the better will be readily acknowledged by most surgeons whose experience has compassed a score or more years, no attempt has been made to assess the changing incidence and mortality. Since such an estimate has an important bearing upon the appraisement of new therapeutic claims, I have thought it desirable to make one and at the same time to try to apportion the credit as far as possible. The results have been striking.

Large figures are obviously essential. Those of the London Hospital for the 30 years 1899–1928 have been taken and, to avoid minor fluctuations and give better perspective, have been collected under six consecutive five-yearly periods. Altogether 3809 cases of burns and scalds were deemed severe enough to require in-patient treatment during the 30 years, and these cases only come under review. Statistics vary with the area served by an institution, but the London Hospital, situated in an average mixed industrial and residential neighbourhood, may well be regarded as typical for the purpose. Treatment has varied with general therapeutic progress and with the ideas and inclinations of the various surgeons, with whose kind consent the figures are given.

The first table shows for each five-year period the number of cases, the number of deaths, and the percentage mortality for all ages.

Table I.—*Burns and Scalds; all Ages.*

Period.	Admissions.	Deaths.	Mortality per cent.
1899–1903	990	251	25·3
1904–1908	901	234	25·9
1909–1913	729	101	13·8
1914–1918	551	61	11·7
1919–1923	352	31	8·8
1924–1928	286	19	6·6

The first two periods, save for an incidence fall of 89, are very similar. From then on, however, the changes are arresting. During 20 years the admissions have fallen to less than one-third, deaths to less than one-twelfth, and the mortality-rate to approximately one-quarter. In each item the fall has been progressive.

Effect of Social Changes and Legislation.

The lessened incidence must be due to factors in the home and in the workshop. It is possible that other hospitals may have diverted some cases, but such an influence can only be very small. On the other hand, there have been many social changes to account for the decline. Oil-lamps and other naked lights are rapidly becoming extinct; the electric bulb is replacing the gas-bracket; flannelette as a clothing material is no longer in favour; overcrowding is

being relieved by better housing conditions; smaller families allow of greater care; factory regulations have been tightened up, and a Children's Act was passed in 1908. This Act, sometimes called the Children's Charter, made it a punishable offence to leave a child of under 7 years of age in a room with an unprotected fire, and also threatened penalties to the guardian of a child for neglect or exposure to injury in any way. Although not so familiar to the better classes, the Act is well known amongst the poor and, if prosecution is rarely instituted, it is because the authorities regard a tragic event as in itself sufficient punishment to the parents.

The falling incidence does not, however, explain the diminishing mortality percentage. The latter may be attributed to improved treatment or to lessened severity of the lesions, or to both. The greatest and most abrupt fall in mortality took place in the 1909–1913 period, when the percentage was approximately halved. The methods of treatment will be referred to later; it is sufficient now to state that there was no sudden or radical therapeutic change about that time. Yet a more gradual effect would be expected if the fall were due to a paucity of serious cases resulting upon the various social changes enumerated above. There is one exception, the Children's Act, which came into force in 1909. Was the Act the main cause of the transformation? Its benefits have been minimised in some quarters, although reference to the Registrar-General's reports should disabuse anyone of doubt. These reports show, since the passing of the Act, a decisive fall in the death-rate from burns and scalds at each age-period of childhood. The fall has been gradually progressive, with the single interruption of a temporary rise during the war years.

The Registrar-General's figures, however, deal only with deaths in proportion to population and not with the mortality-rate in hospital patients. To estimate any effect of the Act on the latter, I have separated various age-groups in the second table.

TABLE II.—*Cases and Mortality-rate at Various Age-periods.*

Period.	Over 12 years.		Under 12 years.		Under 6 years.	
	Cases.	Mortality per cent.	Cases.	Mortality per cent.	Cases.	Mortality per cent.
1899–1903	259	22·0	731	26·5	630	26·2
1904–1908	191	23·0	710	26·6	610	26·7
1909–1913	157	17·2	572	12·9	494	12·7
1914–1918	136	13·2	415	10·3	345	10·7
1919–1923	98	9·1	254	8·7	208	10·1
1924–1928	88	11·3	198	4·5	174	5·2

The second table shows that the mortality-rate has decreased more in children than in adults and that the most abrupt change occurred after 1908. Since the mortality-rate fell in much greater degree than the incidence, and since there were no sudden fundamental changes in treatment, the number of very grave injuries must have altered abruptly. It seems only fair to attribute some part of the amelioration to the influence of the Act, which had revealed to parents the appalling dangers of these accidents. Why the incidence should not have declined pari passu with the mortality is not easy to explain. Possibly a lack of serious cases allowed more beds free to accommodate those which previously would have had to have out-patient treatment. The decrease in severity is noticeable in a general survey of the cases; how the Act may have been responsible can be shown in another statistical fashion. It is easier to prevent a child from being burned than from being scalded; the kettle and the teapot are not so easily circumvented as the fire. If the Act is to receive credit, a change in the proportion of burns to scalds should be expected, and this is found in the third table, restricted for obvious reasons to younger children.

TABLE III.—*Percentage Proportions of Burns and Scalds in Children Under Six Years of Age.*

Period.	Burns.	Scalds.	Period.	Burns.	Scalds.
1899–1903	41·2	58·8	1914–1918	39·1	60·9
1904–1908	40·7	59·3	1919–1923	30·0	70·0
1909–1913	31·4	68·6	1924–1928	30·8	69·2

Thus the ratio of burns to scalds has diminished. The set-back in the war years only emphasises the importance of parental care. The main alteration in the proportion again occurred after 1908, and must be regarded as further proof of a beneficent piece of legislation.

There is, however, another important factor to be considered in children. The prognosis of burns and scalds is usually based on the extent of the lesions, and in a general way this proves to be correct. But it is correct only in a general way, and there are many exceptions to any rule which specifies the approximate extent required to produce death. Therefore the varying resistance of the child must play a part. Post-mortem reports in children dead from burns and scalds at the end of last and the beginning of this century abound with the additional findings of rickets, tuberculosis, and marasmic conditions. Although bodily resistance may not be an easily measurable quantity, the comparative rareness of notice of these extra handicaps in the autopsy records of more recent years cannot but indicate that the children of this generation have a greater chance of survival from these accidents than had their predecessors of a quarter of a century and more ago.

Effect of Treatment.

What part have altering methods of treatment played in the reduction of the mortality-rate? Fraser,[1] writing in 1926 on the subject of burns in children, said: "It is a sphere of surgical work which appears to have made comparatively little progress, at least in so far as the reduction of mortality is concerned." That may be correct. At the same time he referred to a recent investigation into a series of 300 hospital cases in children under 10 years of age in which the mortality-rate was 38·7 per cent. This is profoundly different from the London Hospital figure of approximately 6 per cent., and the implication can only be that he considered social influences as backward as surgical treatment. Such an astounding mortality must surely be due to some peculiar local condition in Edinburgh, and it is to be regretted that the exact years of the investigation were not given. Bancroft and Rogers,[2] of New York, in the same year gave the mortality in a series of 104 hospital cases at all ages as 28 per cent. When one considers the difficulty in predicting which burn may produce a fatal result—for extent is only one factor—then one can only conclude from these mortality figures that hospital accommodation in certain cities must be taxed to an almost incredible extent.

From time to time writers have advanced figures to claim for some treatment a superiority over others. They have, however, failed to take into account the changing social outlook, and too often they have based their contentions on small series of cases. A large series and a simple analysis seem to me the most helpful element of such an investigation, since the

nature of the injuring agent, the degree and extent of the lesion, and the age and physical condition of the sufferer may all vary within wide limits. The greater the series the truer the picture.

Variations in treatment mainly concern the form of the local application and the methods designed to prevent or neutralise the toxæmia which produces the so-called secondary shock. There is but little difference in the methods of combating initial shock by rest, warmth, and sedatives. In recent years the importance of secondary shock has been made to overshadow that of initial shock, I think, to an unjustifiable extent. Ogilvie [3] and Wilson [4] both assert that only a small percentage of patients die of primary shock. Wilson declares that before the advent of tannic acid treatment initial shock was responsible for only 2·5 per cent. of deaths. If one regards those who died on the first, second, or third day without any reactionary rise of temperature as having died of initial shock, then 234 out of my series of 697 deaths can be attributed to it, giving a percentage of 33·6. (Only 22 of the 234 died on the second or third day, a fact which enhances the value of the figures. None was treated with tannic acid.) This percentage can hardly be termed small. The importance of the observation lies in the fact that it is often advised, to counter subsequent dangers, that the patient should be submitted very early to cleansing and local application procedures, and for these an anæsthetic is often necessary. Worthy of merit as this technique may be, it is obvious that with such a large proportion of deaths from initial shock, the wisdom of giving any treatment other than general in the very early stages must be carefully considered in each case. I do not wish to minimise the importance of cleansing the skin and removing dead epithelium before local applications are made. Bacteria find wonderful scope for activity in burned tissues, and the advent of antisepsis and asepsis must have played a great part in the reduction of the later mortality.

LOCAL APPLICATIONS.

The usual choice is between an antiseptic protective dressing, which can be changed easily with little distress to the patient, and one or other of the various solutions which are intended to "fix" the toxins produced by the action of heat upon the tissues. All forms have been employed in the series analysed. Carbolic compresses, numerous antiseptic ointments, picric acid solutions, waxes, and tannic acid have all been in use at one time or another. No preference is to be observed throughout the series for any particular treatment based upon the extent of the injury. In a majority of cases one or other of the various "burn ointments" has been the choice. These are compounded usually of several of the following ingredients—zinc oxide, boric acid, eucalyptus, soft paraffin, wool fat, and castor oil. Tannic acid treatment did not come into vogue until 1926, and only 12 cases so treated are included in the series.

The general tendency in local treatment at the present time is towards "fixation" methods. This inclination has been induced by a growing realisation of the dangers of toxæmia and by the strong advocacy in certain quarters of tannic acid solutions which, theoretically at least, imprison the toxins within a scab. There can be little doubt, from both clinical and experimental evidence, of the existence of such a toxin, although its chemical composition is as yet unknown. While Davidson,[5] who introduced the tannic acid treatment, made no claim for reduced mortality in a large series, he thought that in 15 cases of severe burns so treated the mortality was less than would have been expected with other forms of treatment. Wilson, however, in a report issued by the Medical Research Council, stated that in a series of 105 cases of children treated by tannic acid the mortality was 10·5 per cent. and, contrasting this with Fraser's figure of 38·7 per cent., quoted above, claimed the difference as due to the new treatment. The cases were consecutive hospital admissions, and it was admitted as possible that a larger number of less extensive burns than usual may have been admitted to receive the benefit of tannic acid applications. In the absence of a date for Fraser's series, the claim cannot be properly assessed, since the London Hospital series shows a progressive fall of 26 to 5 per cent. over 25 years without, for all practical purposes, the aid of tannic acid.

TANNIC ACID.

Bancroft and Rogers [2] compared series of burns of approximately similar extent treated by débridement picric acid and dry air, and tannic acid, and gave the mortality-rates as respectively 57, 40, and 22 per cent. But the numbers so treated were ridiculously small. Seven cases only were treated by débridement and nine with tannic acid; it is not clear how many received picric acid and dry air therapy. In a later series of 114 cases treated with tannic acid, they give the mortality as approximately 20 per cent., but give no indication of the severity of the lesions.

A second and apparently very convincing claim made by Wilson [4] is that tannic acid solutions have so countered toxæmia that the proportion of deaths from initial shock has risen from 2·5 to 30·77 per cent. But this latter figure corresponds closely to my estimate, given above and based on 697 fatal issues, of a 33·6 percentage of deaths from initial shock without tannic acid treatment. It is difficult, laying aside statistics and recalling one's experience, to believe that only 1 in 40 deaths is due to primary shock.

Tannic acid treatment may or may not be the great advance claimed by these writers, but their statistics are useless in its advocacy. My personal view, based admittedly on a moderate number of cases, is that it is no better than any other local application in combating toxæmia. Its advantages seem to me to be more in the production of a scab which obviates painful dressings, and under which the reparative processes proceed smoothly. But that is only if sepsis does not supervene. Advocacy of immediate tannic acid applications where the burned area cannot be thoroughly cleansed beforehand seems to me not only futile but dangerous. Tannic acid certainly has its place in treatment, but there must be judicious care in the selection of cases.

SHOCK.

Assuming, then, that there is no great difference in merit between the modern forms of local applications, can any credit at all for reduced mortality be given to improved treatment? The simplest way to determine this, I think, is to investigate any changing proportion of deaths from initial shock. Such deaths are easily definable compared to those occurring later, when very often there may be a combination of toxæmia (which may manifest itself in many ways), sepsis, and exhaustion. If there has been any advance in local treatment, the lessened number of deaths from later causes will have produced a relative increase in the proportion of deaths from primary shock, in which treatment has probably altered but little. The figures become very small and discount the analysis, but perhaps they may be confirmed by others.

If any inference can be made from Table IV., it is that there has been a progressive relative increase in deaths from initial shock, suggesting an improvement in treatment directed towards the secondary dangers. I would attribute this to a greater appreciation of the need for cleansing the burned area and removing loose dead tissue at the earliest practicable time, to advances in antisepsis, and to a realisation of the necessity of the administration of fluids in the presence of toxæmia.

TABLE IV.—*Deaths due to Initial Shock; all Ages.*

Period.	Total deaths.	Deaths from initial shock.	
		Number.	Per cent.
1899–1903	251	76	30·2
1904–1908	234	68	29·0
1909–1913	101	41	40·6
1914–1918	61	24	39·3
1919–1923	31	14	45·1
1924–1928	19	11	57·9

From personal experience and in the light of the figures I have quoted, I am much more inclined to put faith in the neutralisation of the toxæmia by the introduction of fluids into the circulation than in its prevention by any local application at present known. Davidson [5] has shown that the most important circulatory changes in burns are a rise in the non-protein nitrogen and a marked depletion of the blood chlorides, a state similar to that in acute intestinal obstruction. Bancroft [6] therefore recommends the daily administration by hypodermoclysis of as much as 2000 or 3000 c.cm. of normal saline, or of smaller quantities of hypertonic saline when the toxæmia is more severe. Fraser,[7] who also emphasises the importance of fluid intake, points out, in addition, the serious call made upon the alkali reserve of the body by deranged metabolism consequent on the toxæmia, and for this advocates the administration of alkalis, in particular alkaline sodium phosphate. The addition of glucose is recommended for children by all. From these neutralising methods I have seen many happy results in established toxæmia. Used prophylactically, they have probably saved many lives.

Conclusion.

Social changes, legislation, and improved treatment have all contributed to a transformation. The impression left by the analysis is that the first two have outdone the third. Mortality has now fallen to such a figure that any further reduction is most likely to follow on some revolutionary change in treatment. These seems to be little difference in merit between the various local applications in use, and possibly too much attention is focused on the actual lesion. It would be well, to change a familiar slogan slightly, to be able to "fix and forget," but that time is not yet. Neutralisation of the toxins and their effects is at present a more satisfactory procedure than their fixation.

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PARALYSIS OF CAPILLARY BLOOD-VESSELS OF THE HAND

FOLLOWING WOUNDS OF THE FOREARM.*

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WHILE serving at a hospital in France during the war I was able to note certain immediate nervous disturbances in the hand following gunshot wounds in which the projectile had perforated or passed close to the central compartment of the forearm. Several opportunities occurred afterwards for me to observe the later consequences of these injuries. The cases about to be discussed are in two groups. In the first are those of men who were seen within a day or two of being wounded and were then lost to sight. Of these only the briefest notes were made. Soldiers with this type of wound were usually evacuated to England without delay. Other circumstances, too, were unfavourable to the careful and deliberate investigation of minor wounds. The second group of cases includes men who, having suffered from the same kind of injury as those in the first group, were not seen by me until a considerable time had passed since the infliction of the initial lesion.

Group 1. (Cases 1 to 11.)—For a short while after a bullet or fragment of shell has perforated the forearm so as to traverse the interosseous space or to pass in the near neighbourhood of the anterior interosseous artery, there is a more or less complete glove anæsthesia together with loss of power in the hand. Within the next few days the anæsthesia disappears, recovery taking place, as a rule, in even zones from above downwards, just as occurs in anæsthesias of mental origin, although it happens occasionally that complete sensibility is restored to the ulnar side of the hand sooner than to the radial side, or vice versa. The muscular paralysis, which at the first may have amounted only to a pronounced weakness, also gradually improves in the next few days after the wounding. I must admit that sensation was tested in most cases merely by light pricks of a common pin, and muscular power by telling the patient to abduct and adduct the thumb and fingers, and to straighten the fingers. But, crude as they were, it soon became evident that these tests were of practical value. I was looking at that time for cases of arterial injury with ischæmia, and these tests were sufficient to pick out such cases quickly from amongst a large number of wounded.

Arterial ischæmia in the upper limb is accompanied in the early stages by (*a*) a glove anæsthesia of the hand which is absolute for all forms of sensation, (*b*) a complete paralysis of the small muscles of the hand, (*c*) increased surface temperature of the affected limb, (*d*) a hardening of the affected muscles. It became apparent almost at once that two kinds of case were being collected by the preliminary tests—namely, (1) cases of genuine ischæmia due to wounds of the main arterial trunk, and (2) other cases in which the main artery had not been obstructed but in which the projectile in passing through the arm had passed close to the main artery or, in wounds below the elbow, had traversed the central compartment of the forearm.

From anatomical considerations alone it is obvious

* The term "capillary" throughout this paper denotes every blood-vessel which has no muscular coat.

that a bullet which passes through or close to the sheath of the brachial artery is apt to cause contusion, and perhaps closure, of the artery, in addition to lesions of the nerve trunks. Consequently, and to avoid disputable material, this paper has been confined to wounds of the forearm where ischæmia need not be considered and where the nerve trunks are not in close anatomical relationship. I may remark, to avoid misunderstanding, that wounds of the arm above the elbow are sometimes followed by symptoms like those of the cases now under discussion, which I shall attribute to paralysis of the small blood-vessels of the hand. The difficulty in basing an argument upon these wounds above the elbow is that the particular phenomena to which I wish to draw attention may be confused with, and perhaps overshadowed by, symptoms due to a concurrent injury to the main artery or to the large nerve trunks. It is true that even in the forearm we meet with coincident injuries which complicate the clinical picture as, for example, when a median nerve paralysis coexists with a paralysis of the capillary blood-vessels of the entire hand. Nevertheless, in this region pure cases, untainted with arterial ischæmia or with ulnar or median paralysis, are sufficiently common to form the material basis of a useful study. Even when there is evidence of a partial lesion of the ulnar or median nerve, as in some of the examples given below, this lesion can hardly be made responsible for the extensive paralysis of the small blood-vessels, in view of the similar paralysis which occurs without any injury of these nerves.

Group 2. (Cases 12 to 22.)—More striking than the immediate symptoms of these wounds which pass through the central tract of the forearm are the permanent consequences. The chief of these are persistent coldness of the hand and impaired capacity for manipulation. The coldness is pronounced. The patient will say that he has taken to wearing two gloves but still cannot keep his hand warm. Moreover, though cold, the hand in some cases may be seen to be engorged with blood and varying in hue from almost normal to dusky red or bluish-purple according to the circumstances. Usually, too, there is a distinct diminution of sensibility which can be detected by the use of light pricks.

The efficiency of the hand as a motor organ in these cases is lessened in two ways. In the first place the movements of the fingers and thumb become awkward, and fine work with them is no longer possible. When asked to button up his coat or waistcoat with the defective hand the patient will set to work in a clumsy way, and perhaps fail in the end, exactly like a healthy man whose hand is numb with cold. The second muscular defect is the early onset of fatigue, often accompanied by cramp. There is a close resemblance in this to the claudication and cramp of fatigue in a limb the circulation of which is known to be impeded by an organic cause, and also to writer's cramp, which may be brought about by a localised pressure on the forearm when writing in a bad posture—that is to say, with the flexor surface of the forearm resting on the edge of a ledger or a desk.

That these disturbances of sensation and muscular power are not minor disabilities is clear from the fact that of six patients in Group 2 whose right hands were affected, four had already become left-handed when I first saw them. In the remaining two the utility of the right hand had become greatly impaired on account of weakness, clumsiness, and incapacity for sustained effort, although the patients had not become definitely left-handed.

In none of the cases did the nails atrophy or the skin become glossy, a minor degree of wasting—possibly from disuse—being the only atrophic change observed.

Discussion.

To some extent the foregoing cases recall those reported by Meige, Benisty, and Lévy,[1] under the title of "Impotence de tous les mouvements de la main et des doigts, avec intégrité des réactions électriques (main figée)." There is this difference, however, that in my cases there was no muscular spasm so long as the limbs were at rest, although minor cramps and spasms were brought about by exertion. Babinski and Froment,[2] who paid special attention to the condition of "congealed hand," as described by the authors mentioned above, differentiating it from other known organic affections and from contractures or paralyses of an hysterical nature, refer to purely paralytic forms unaccompanied by muscular spasm, and it is perhaps to this group that my cases belong. But I have not seen any paper dealing with these sympathetic nerve injuries in which the anatomical relationships of the wound track are given in exact detail. Babinski and Froment regard these disabilities as being of a reflex character analogous to the muscular wasting and weakness which accompany arthritis, and they look upon the symptoms as being produced in a large measure by lesions of the sympathetic system. They are careful to point out that with a long lasting diminution of blood flow and hypothermia a third factor may come into play—namely, the accumulation of physiological poisons in the affected parts. In their cases the hypothermia, in particular instances and conditions, was pronounced, the difference of surface temperature on the injured and sound limbs being as much as 8° C. In one case, after immersion of both limbs in water at 40° C. for ten minutes, the injured limb became hotter than the sound one by 1°–2° C.; and the return to normal was more rapid in the normal limb. This corresponds with my own observation in Case 12 of this paper.

That little attention has been paid hitherto to this type of nerve lesion is easily explained by the fact that sympathetic nerve injuries have been so often combined with wounds of other structures that their less dramatic manifestations have been obscured by more obvious damage such as severance of nerve trunks, arterial blockage, fractures of bone, and extensive lacerations of skin and muscle. Moreover, at the time of the war, little being known concerning the innervation of the blood-vessels, there was a tendency, in the absence of any satisfactory alternative formula, to diagnose the malady as "functional"; and it is interesting to note that with each of my Group 2 cases in which an official diagnosis had been made the label was "functional." One of the patients had undergone a course of psycho-analytical treatment for an entire year without any benefit.

That my cases were not examples of conversional hysteria seems to be certain (vide Nos. 12, 15, and 18). Even if my confidence in this opinion is not quite justified by the internal and particular evidence in each case, there still remains the fact of a definite and uncommon disability constantly associated with an equally definite and uncommon injury. In view of such an association it is almost impossible not to deduce a relationship of effect and cause between them; and it is hard to doubt that the underlying lesion, responsible for the sensory and motor defects of the hand, is a paralysis of the small blood-vessels. In other words, these vessels no longer have the power

of adapting the calibre of their channels to the changing needs of the tissues which they supply with blood. I have assumed, possibly, I admit, on insufficient grounds, that the paralysed capillaries remain more or less constantly dilated, while the arterioles which supply them are for most of the time and in ordinary circumstances contracted.

To explain this vascular paralysis in the hand following wounds of the forearm we are almost forced to believe in the existence of a special nerve tract which follows a path somewhere about the central axis of the limb and which regulates the calibre of the small vessels of the hand. That the nerve-fibres concerned are spread out and not condensed into a compact nerve is suggested by instances (Cases 2, 5, and 7) in which a lesion involving only part of the tract had occurred. Yet the tract cannot be much spread out, for partial injuries seemed to be less common than complete ones, although, perhaps, this argument is fallacious as the tests which I applied when collecting the clinical material were very primitive.

Where is this hypothetical nerve tract? Figs. 1 and 2 represent diagrammatically with such correctness as could be achieved the paths of the projectiles which brought about the vascular paralysis. There are two obstacles to accuracy in such charts. First, a straight line cannot be used adequately to represent a gunshot wound. Secondly, unless we know in what position the forearm was at the moment of perforation we cannot exactly portray the passage of the missile through the limb by means of a chart. In some instances the soldier could say exactly in what posture he was when struck; one, for example, stated that he was carrying his rifle at the trail, another that both his hands were stretched out above his head supporting a sandbag. Where no such information was obtainable, the wound track could sometimes be elucidated by the structures divided, especially if bone had been broken. In other cases the matter was a pure guess. None the less, it is suggestive that a plotting of the supposed wound tracks upon a single chart shows approximately a common locus of intersection which is somewhere near and anterior to the interosseous membrane.

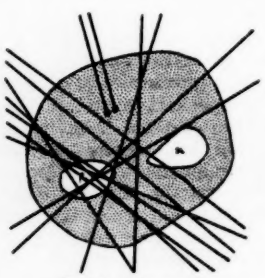

FIG. 1.—Group I.

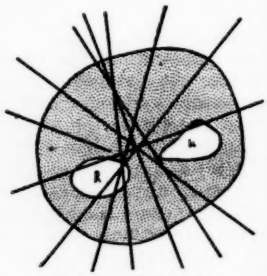

FIG. 2.—Group II.

Transverse sections of forearm showing diagrammatically the wound tracks in the Group I. and Group II. series respectively.

I am not aware of any fact which prohibits the supposition of a special nerve tract in the forearm controlling directly or indirectly the vascular adaptations of the hand. The anterior interosseous artery is, ontogenetically, the main artery of the forearm, being later displaced from this function by the median artery, which in its turn becomes replaced by the radial and ulnar arteries. Consequently, if there are nerves passing along the forearm to supply the capillary networks of the hand, we should expect to find them somewhere about the anterior interosseous or the median artery. To this extent theoretical considerations support the practical observations which form the basis of this little essay.

The vasomotor nerves supplying the web of a frog's foot were accurately traced by Langley.[3] He found that the constrictor fibres for the vessels of the lower limb left the spinal cord in the third to the seventh spinal nerves, and, passing from these along the rami communicantes, joined the sympathetic chain. Thence some passed to the sciatic nerve, while others travelled along the arteries. Those which accompanied the arteries apparently were chiefly concerned with the calibre of the proximal portions of these vessels, while the vessels of the web of the foot were supplied by the sciatic nerve. Thus stimulation of the peripheral end of the divided sciatic nerve caused constriction of the vessels of the web, while stimulation of the sympathetic after division of the sciatic nerve caused no trace of vasoconstriction in the foot. These results held good for mammals also, and they have since been confirmed by Krogh[4] and Ebbecke,[5] both of whom failed to produce constriction of the vessels of the foot by stimulation of the femoral artery. Woollard,[6] also, has found that the constrictor nerve-fibres of the hind foot of the cat do not travel down with the main arterial trunk but are derived from the adjacent peripheral nerve trunks, and his careful inquiry confirms the findings of the experimenters mentioned above. There is evidence that the same anatomy holds good in man, for other surgeons besides myself have experienced a failure to bring about any durable vasodilatation in the hand or foot after periarterial sympathectomy of the axillary or femoral artery.

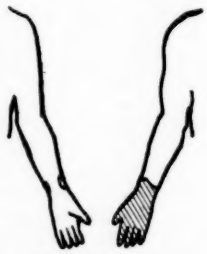

FIG. 3 (Case 1).

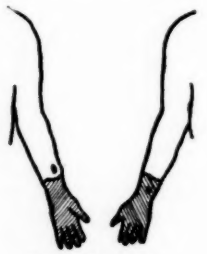

FIG. 4 (Case 2).

In these and subsequent figures the shaded areas represent reduced sensibility to pin-pricks. Entry and exit wounds are indicated by outlines. Figs. 3 to 9 show front and back of left arm.

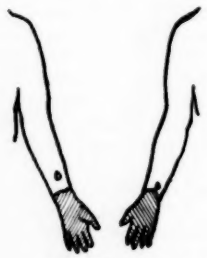

FIG. 5 (Case 3).

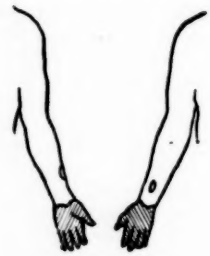

FIG. 6 (Case 4).

Earlier in this paper I have expressed the opinion that my patients suffered from a more or less permanent capillary dilatation with contraction of

arterioles, and this makes it necessary to accept the fact that the capillaries are normally under nervous control; an acceptance about which there need be no hesitation. Woollard [6] was able to trace a continuation of the sympathetic investment of the arterioles to the capillaries in the form of non-medullated fibres which did not appear to form any terminal

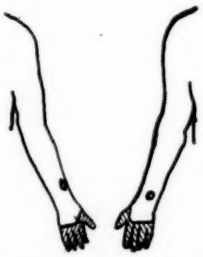

FIG. 7 (Case 5 on 27/10/17).

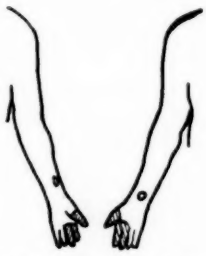

FIG. 8 (Case 5 on 1/11/17).

apparatus with the capillary endothelium. In a few cases, though not in most, these nerves could be traced to the finest capillaries. And Doi,[7] Gabbe,[8] Harris and Marvin,[9] and Krogh [4] have amply proved the occurrence of dilatation and constriction of capillaries in response to stimulation of nerves.

Admitting this fact of the nervous government of the calibre of the capillaries, it is impossible to escape from the logical conclusion that severance of the appropriate nerves will be followed by some form of vascular paralysis. That nervous influences are not the only agents of vascular control is now recognised, owing largely to the investigations of Dale and his co-workers on the action of histamine, and to Lewis's enlargement of this theme. Indeed, Lewis [10] regards the nervous mechanism of the small vessels in the light of a coarse adjustment only; a direct control by the tissue needs forming a fine adjustment of great precision. In the cases which I have recorded it is the coarse adjustment which has been damaged, and the limitations of the fine adjustment to meet the tissue needs form the symptomatology of these special lesions. Prominent amongst these limitations appears to be the failure of the vessels to react normally to heat and cold.

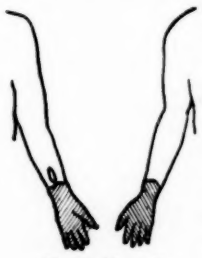

FIG. 9 (Case 6).

Lange, Ehrich, and Cohn,[11] by observation of chick embryo membranes, established that the calibre of capillary vessels responds appropriately to direct mechanical stimulation in the entire absence of any nerves, and that these reactions are similar, as a rule, to those which take place in normally innervated tissues; but it is noteworthy that heat and cold form exceptions, inasmuch as the non-innervated capillaries of the embryonic chick membrane do not alter their calibre in response to the application of thermal stimuli. This observation may be regarded as possibly bearing on the fact that the most outstanding feature of my cases is the failure of the small vessels of the hand to react appropriately to alterations of the external temperature.

Langley [3] showed that in the mammal the distribution in the skin of the sympathetic fibres contained in a spinal nerve at its union with a plexus is approximately the same as the distribution of the sensory fibres of the nerve, and I do not maintain that all the vasomotor fibres of the hand are gathered together in a single compact tract in the forearm. My view, subject to further information, is that the majority of vasoconstrictor fibres for the capillaries of the hand are loosely aggregated near the central axis of the forearm, while perhaps a few of the fibres remain outside this tract and accompany nerve trunks into the hand. Nevertheless, when the chief tract is interrupted the functions of the hand become defective in a manner that is characteristic, and which is not produced by any other pathological condition.

Illustrative Cases.

GROUP I.

CASE 1, wounded Sept. 2nd, 1917, and seen on Sept. 5th. Entry wound on radial border of left forearm, two inches above wrist. Fragment lying under skin of ulnar border of forearm. Fissured fracture of radius. Foreign body extracted. Ulnar artery tied. Anæsthesia as in Fig. 3. Muscle power cannot be tested.

CASE 2, wounded Sept. 26th, 1917, and note taken Oct. 3rd. Entrance wound radial side of forearm, three inches above left wrist. Exit two inches above wrist in mid-dorsal line of forearm. No complete fracture of radius. Radial pulse felt. Anæsthesia as in Fig. 4.

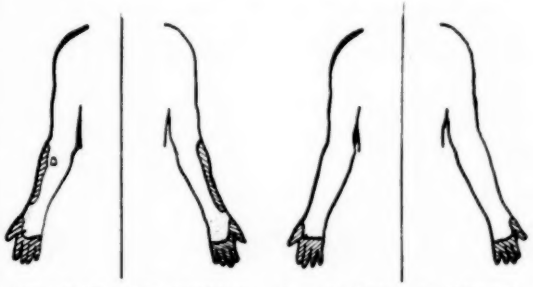

FIG. 10 (Case 7 on 16/10/17). Front and back of right arm.

FIG. 11 (Case 7 on 20/10/17). Back and front of right arm.

In the stippled area pin-pricks led to variable responses.

CASE 3, wounded Oct. 4th, 1917, and seen Oct. 5th. Entrance wound radial border of left forearm at junction of middle and lower thirds. Exit on dorsal surface of forearm towards ulnar margin, one inch above the wrist. Radial pulse felt. Complete glove anæsthesia as in Fig. 5.

CASE 4, wounded Oct. 26th, 1917. Note from C.C.S. states: "Compound fracture radius. Wounds excised, bleeding points tied, bipp." Seen on Oct. 28th. Entry wound over lower end of left radius on dorsal surface. Exit on radial border of forearm at a slightly higher level. Complete glove anæsthesia, unchanged on Nov. 1st. (Fig. 6).

CASE 5, wounded Oct. 26th, 1917. Note from C.C.S. states: "Through-and-through wound, just above left wrist-joint. Compound comminuted fracture radius and wound of radial artery. Wounds excised. Radial artery ligated. Foreign body removed. Flexor carpi radialis divided." Seen on Oct. 27th. Cannot move fingers. Nov. 1st: Sensation has partially returned (Figs. 7 and 8).

CASE 6, wounded Oct. 12th, 1917, seen Oct. 13th. Wound 2 inches long in anterior surface of left forearm in mid-line 3½ inches above wrist-joint. No exit. No œdema of hand. Can move fingers. Radial artery not palpable. Left hand colder than right. Hand "feels numb." Glove anæsthesia to pin-pricks up to a level ¾ inch below wound. Oct. 20th: No anæsthesia to pin-pricks. Left hand still colder than right (Fig. 9).

CASE 7, wounded Oct. 12th, 1917. Seen on Oct. 16th. Single entry wound in mid-line of anterior surface of right forearm, ½ inch above the middle. No exit. Radial pulse felt. Right hand colder than left. No œdema of hand or forearm. Movements normal. Oct. 20th: Partial recovery of sensation (Figs. 10 and 11).

CASE 8, wounded Oct. 13th, 1917. Note taken Oct. 15th. Small entry wound in dorsal surface of left forearm in middle third, a little to ulnar side of mid-line. Small exit on palmar

surface of forearm to radial side of mid-line and at a slightly lower level than entry wound. The ulna has been chipped but not completely fractured. Radial pulse felt. No œdema of hand. Left hand warmer than right. Has a feeling "like electricity" in his fingers. Movements difficult to test on account of pain. Oct. 20th: Partial recovery of sensation. Left hand still warmer than right (Figs. 12 and 13).

CASE 9, wounded Oct. 26th, 1917. Note taken Oct. 27th. Entry wound palmar surface of left forearm towards radial side. Exit on postero-internal border of forearm. Both wounds are a little below the middle of the forearm. Ulna fractured. Glove anæsthesia to pin-pricks as in Fig. 14.

CASE 10, wounded Oct. 3rd, 1917. Note from C.C.S. states: "E. and E. wound of left forearm. Excised. Radial vessels tied. Bipp." Good radial pulse. Movements complete. Complete glove anæsthesia to pin-pricks and light touch. "No pins and needles." Oct. 20th: Left hand colder than right. No anæsthesia to pin-pricks now. Patient says the tips of his fingers still feel numb (Fig. 15).

CASE 11, wounded Oct. 9th, 1917. Note from C.C.S. states: "E. and E. wound. Comminuted fracture of radius. Arm tense. Ulnar vessels divided. Ligated. Ulnar nerve not injured. Median nerve not seen. Track cleaned." Oct. 12th: Wounds are in upper third of forearm, one being situated on ulnar border of flexor surface, the other on the radial edge. Anæsthesia as in Fig. 16. Oct. 20th: Anæsthesia unchanged. Right hand considerably warmer than left.

GROUP II.

CASE 12, wounded March 29th, 1918, by a fragment of shell which passed through the lower end of the left forearm without fracturing the bones. Examined and notes taken on Sept. 30th, 1919. There is a scar in the mid-line of the palmar surface of the left forearm two inches above the wrist-joint. The exit is on the dorsum a little to the ulnar side of the forearm, two and a half inches above the wrist-joint. The projectile has passed through the interosseous membrane. The patient says that for some time after he was wounded the hand "felt numb, although he could feel with it all right." When the palmar scar is pressed upon a pain shoots down the index-finger. There is no anæsthesia or loss of muscular power. The left hand is slightly cyanosed and cold compared with the right, the coldness and blueness extending above the level of the scar. Patient states that he felt the cold very much in his left hand during last winter.

FIG. 12 (Case 8 on 15/10/17).

FIG. 13 (Case 8 on 20/10/17).

Figs. 12 to 15 show back and front of left arm.

The following experiments were carried out. Both hands and forearms were placed in a hot cage and examined after a sufficient interval. Both hands were hot, red, and sweating. The left was more red than the right, but the surface temperature seemed the same in both. Ten minutes after removal from the cage, the hands and forearms in the meantime having been exposed to the air, the left hand was redder and warmer than the right.

On Oct. 2nd both hands were immersed in cold—not iced—water for five minutes, but this caused no blueness. On removal no difference of surface temperature in the two hands could be detected. Five minutes after the hands had been removed and dried the left hand was colder than the right.

This patient made no complaint about his old wound. He happened to be in hospital for another reason when the scars in his forearm were noticed, and the condition was investigated in order to discover if any lasting abnormal phenomena had followed this through-and-through wound of the forearm.

CASE 13, wounded Oct. 7th, 1917, and examined Nov. 2nd, 1920. The entry wound is on the radial border of the left forearm, just external to the radial artery, and the exit in the dorsum of the forearm on the ulnar side of the mid-line. Both wounds are at the level of the junction of the middle and lower thirds of the radius, which has been fractured and successfully plated. The entire left hand and fingers are cold as compared with the right, and they are also considerably thinner than their fellows of the right side. The colour of the two hands is the same, neither pallid nor cyanosed. Sensation to pin-pricks is almost abolished in the tips of the fingers and thumb. He states that the hand feels the cold very much, and he has difficulty in carrying out fine movements with the thumb and fingers of the left hand, for example, unbuttoning and buttoning up his waistcoat. The movements resemble those of a man whose hand is numb with cold.

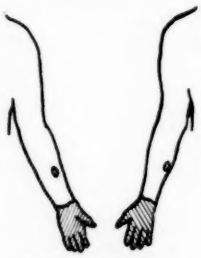

FIG. 14 (Case 9).

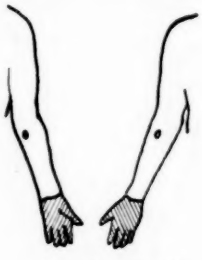

FIG. 15 (Case 10).

CASE 14, wounded Nov. 1st, 1918, and examined on Sept. 12th, 1922, when he showed scars from a perforating wound of the right forearm with fracture of both bones. The scars of entry and exit wounds are both large; one occupies the radial half of the anterior surface at the junction of the middle and lower thirds, and the other occupies the ulnar half at the same level. The right hand sweats and gets cold, but he has not become left-handed. He is a shop assistant. He gets cramp in his hand after writing about a page, and is clumsy with the hand in buttoning and unbuttoning his waistcoat, but there is no loss of sensation.

CASE 15, wounded Oct. 9th, 1917, and examined on Dec. 17th, 1920, when he showed a scar 5 inches long on the ulnar border of his left forearm, and another 4 inches long on the radial border of the same limb. Both bones are said to have been splintered. There is some wasting of the left forearm, but no paralysis. His left hand is slightly colder than his right, but he makes no complaint of coldness. Movements of the left hand are clumsy, and he is not able to perform fine movements well—e.g., buttoning his waistcoat. There is a reduction of sensation to pin-pricks up to the elbow—i.e., above the level of the wound. The fingers of the left hand are considerably smaller than those of the right, and the grip is diminished. He is a strong man, not in the least neurotic, and is in full employment.

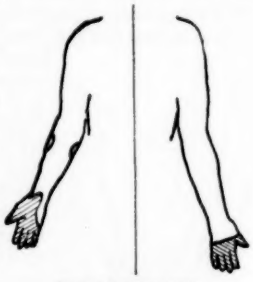

FIG. 16 (Case 11).
Back and front of right arm.

CASE 16, wounded May 22nd, 1916, and examined on March 18th, 1921. He shows entry and exit wounds in the right forearm with a fractured radius at the junction of the middle and lower thirds. The entry is just to the ulnar side of the mid-line on the anterior surface, and the exit in the mid-line of the dorsal surface. He cannot extend his wrist beyond a straight line, but movements of the radio-ulnar joint are normal, and his hands are equal in temperature. There is some loss of power in his right hand. Touch sensation is normal, but sensibility to light pin-pricks is lost to the upper level of the wounds back and front. He can distinguish the point from the head of a pin. Light pin-pricks feel like touches, but localisation is accurate and joint sense normal. There is no other loss of sensation, though he says that the hand feels numb. Originally a right-handed man, he now uses his right hand but little. It is wasted and soft, while his left hand is horny. He has some difficulty in buttoning and unbuttoning his waistcoat with right hand; he goes to work at it like a child, and there is a good deal of clumsy fumbling. He uses both hands, but can do it with one. He has never been able to write.

CASE 17, wounded Sept. 1st, 1918, in right forearm, which shows scars of a perforating wound through the interosseous

space just below the elbow, in about the mid-line back and front. The right hand is wasted and always cold, and he has become left-handed since his wound. There is no paralysis. The right radial pulse is only just palpable, but there is no anæsthesia to touch. Pin-pricks are not felt as pain unless the pin is thrust deeply in, and then the pain is but slight. He will readily thrust pins into his right hand. He can distinguish pricks from touches, has no loss of sensation to touch, and localisation is perfect.

CASE 18, injured Feb. 21st, 1908, by a steam-ventilating fan which fell on to his forearms. A note was taken on July 26th, 1921. Copy of "Hurt Certificate": "A deep wound of the outer side of left forearm at the upper part. The supinator longus was almost divided and evidently some branches of the musculo-spiral nerve. Also a severe injury to right wrist." He states that the tips of the fingers of his left hand are a little numb as compared with those of the right hand. In cold weather the numbness amounts to complete insensitiveness, so that he has burnt his fingers with a match without noticing it at the time. He does not smoke. Muscular weakness accompanies the numbness, and he cannot do fine work with the fingers of the left hand. Pin-pricks are distinctly less painful in the left fingers than in the right, although there is no appreciable coldness of the left hand compared with the right (this was on a very hot day).

Additional Note.—The wound of the left forearm is in the upper third and comprises the radial half of the anterior surface. There is no paralysis. It is to be noted that the wound of the right wrist was more severe than that of the left forearm, dividing (all) the extensor tendons of the fingers, so that the symptoms cannot be attributed merely to the magnitude of the scar, or to a "functional" cause.

CASE 19, wounded on July 31st, 1917, in the left forearm. A note was taken on July 29th, 1921, when he showed scars of a through-and-through shell wound with a fractured radius. For the first nine months or so after the receipt of this wound the entire hand was numb, then sensation returned in the little and ring-fingers. On July 29th, 1921, his left hand is greatly wasted as compared with the right, the wasting not being confined to the distribution of the median nerve. He has no paralysis whatever, nor actual loss of sensation to pin-pricks. Pressure on the anterior scar causes pain in the distribution of the median nerve. The left hand is cold as compared with the right, and there is an area of diminished sensation to pin-pricks.

CASE 20, wounded in the right forearm on May 2nd, 1915, and noted August 18th, 1921. The entry wound is just in front of the ulnar border of the forearm in its middle third, and the exit on the radial half of the dorsal region at the junction of the middle and lower thirds. The radius has been fractured. The exit wound is large. He has loss of sensation to light touch, and diminution of sensation to pin-pricks over all the fingers and thumb of his right hand, and says that the right hand is weak and grip is diminished.

CASE 21, wounded July 7th, 1916, by a rifle bullet. The entry is at the junction of the middle and lower thirds of the right forearm to the radial side of the mid-line. The exit is at the same level behind, but to the ulnar side of the mid-line. He is said to have had a fracture, but there is no evidence of that now. The entry and exit wounds are small.

For the first fortnight he says the hand and arm were numb below the wound. Then pain came on and went right up the arm into his neck—"felt like 101 teeth all aching"—and kept him from sleep. The pain gradually became confined to the arm, and disappeared about three months later. When the note was taken (Nov., 1921) he had had one year's treatment at a special out-patients' clinic by psycho-analysis, without any benefit, and the condition was again diagnosed as "functional." Seen again in July, 1923, he was found to suffer still from considerable loss of function in the right hand, which shows signs of atrophy, is tremulous, cold, sweating, weak, and subject to cramp. He has become left-handed. The grip in the right hand is 20 pounds and in the left is 110 pounds. The arterial pressures in the right and left upper extremities are equal, and there is no obvious difference in the filling of the veins. The ring and little fingers are contracted in a manner suggestive of ulnar nerve injury, though this contraction seems only to have appeared recently.

CASE 22, wounded on March 21st, 1918, in the right forearm, and note taken May 3rd, 1921. The entry wound is to the ulnar side of the mid-line in front—i.e., between the median and ulnar nerves, just above the wrist. The exit wound is on the radial side of the mid-line behind. The radius has been fractured. Since being wounded he has become left-handed, even for writing, because his right hand is weak. It sweats a lot in summer and is cold in winter. Sensation in the right hand is normal, except that the tip of the forefinger gets numb. He has no paralysis, tenderness on pressure of the scars, or trophic changes.

CASE 23, wounded by a rifle bullet in the left wrist on June 26th, 1917, and note taken August 26th, 1921. The entry wound is in the thenar eminence, just to the ulnar side of the base of the first metacarpal. The exit wound is on the ulnar border of the wrist, half an inch below the head of the ulna. Movements of the wrist-joint are normal. The hand gets crampy and cold in winter, and is at times practically useless; it is slightly colder than the right now but shows no trophic changes. Touch and pain sense in the left fingers are lessened as compared with the right.

CASE 24, in November, 1920, received a severe blow on the right thenar eminence from the back-fire of a motor handle A note was taken on July 29th, 1921, when he complained that (1) his thumb (not the fingers) gets quite insensitive in cold weather, while it is always less sensitive than the fingers or than the other hand, even when the temperature of the hands is equal; (2) his forearm gets easily tired on exertion—enough to disable him. He can write normally to start with, but begins to have difficulty after writing about 200 words, and then has trouble in shaping his letters. The pulse in the right thumb is more distinct (more collapsing?) than in the left thumb. There is a diminution of acuteness of appreciation of pin-pricks in the right thumb.

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EFFECT OF ADDED IRON ON THE HÆMATOPOIETIC PROPERTIES OF DRIED MILK.

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IN a series of investigations whose brilliant execution has rendered them deservedly classical, despite the short time which has elapsed since they were begun, Steenbock and Hart and their colleagues [1] at Wisconsin have demonstrated the essential synergetic rôle played by copper in hæmoglobin formation. During their investigations they elaborated a technique for producing nutritional anæmia, sometimes referred to as "milk anæmia," in the albino rat. This has rendered possible an extension of their investigations both in their own laboratories and elsewhere.

In a recent paper Supplee [2] and others have reported the effect of different methods of drying on the iron content of milk, and have concluded that the actual process of drying milk on polished rollers is sufficient to increase its iron content to a point adequate for normal hæmatopoiesis. They found that this was not the case when milk was dried by the spray process, nor was there any appreciable increase of iron in liquid milk after it had been boiled for two minutes.

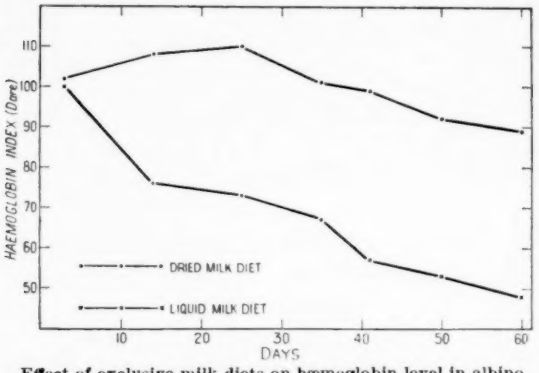
Telfer [3] has emphasised the need to consider carefully the amount of iron present in the diet of infants, and has specially called attention to the probable deficiency of many proprietary infant foods in iron. His conclusions, as well as the paper of Supplee and his co-workers, were published subsequent to the termination of the investigation described below. This had for its object to ascertain whether the incorporation of a soluble iron salt in a modified roller-dried milk during manufacture would confer on that product any hæmatopoietic superiority over liquid cow's milk. The amount of iron added was sufficient to raise the iron content of the dried milk, reconstituted one in eight, to 40 parts per million. This is approximately

three times the normal iron content of liquid cow's milk.

TECHNIQUE.

The technique used in this experiment was similar to that advocated by Hart, Steenbock, and co-workers. Because, presumably, our animals had lower iron reserves than theirs, we found in a preliminary experiment that, taken straight from stock diet and given milk only, they began immediately to show the lowering of hæmoglobin content characteristic of experimental anæmia in rats. The "running out" period during the later stages of lactation and the earlier stages of the actual experimental period, recommended by the Wisconsin workers, could therefore be dispensed with in our investigation.

Albino rats of the Wistar Institute Tyler strain, rigorously inbred in this laboratory for six years, were used throughout the work. The series on the two milks were strictly comparable, equal numbers of



Effect of exclusive milk diets on hæmoglobin level in albino rats (each graph average from five animals).

isogenic animals (animals of the same sex and litter) being present in each series of three males and two females. Following the recommendation of Waddell, Steenbock and co-workers [4] we did not make hæmocytometric determinations, and the hæmoglobin estimations were carried out on a Dare hæmoglobinometer. Although this instrument, being calibrated for normal human blood as 100, does not give values in any sense absolute when used for rats' blood, it was found to give consistent and reproducible results with very little practice, and since only comparative results were wanted, proved excellently suited to the purpose of the investigation. The control series was given fresh cow's milk ad libitum. The experimental series was given the dried milk with added iron, reconstituted with seven times its weight of water, also ad libitum. The animals on the dried milk showed an almost constant normal hæmoglobin index throughout, while those on fresh milk lost hæmoglobin rapidly. The differences in hæmoglobin content are shown in the accompanying graph, where the values for the animals in each series are averaged and plotted against time. In the control series it was found impossible to obtain a blood sample for one of the animals on the thirty-fifth day of experiment, so that the last three points on the graph for this series represent the average for four animals only (see Figure).

RESULTS.

Such differences as were shown by the animals can certainly not be attributed to differences in food intake. This was measured, and was found to be very nearly constant, about 40 g. liquid milk per rat per day, and almost identical in each series, being, if anything, lower for animals receiving the dried milk than for the controls.

For some reason the animals on the liquid milk grew slightly more than those on reconstituted dried milk, the respective average total increases being 28 and 35 g. in 60 days. This is contrary to the findings of the Wisconsin workers, but the differences in growth-rate are quite probably not significant. It will be further recalled that the Wisconsin investigators fed the experimental diet for 40 to 60 days before beginning to make hæmoglobin determinations. During this "running out" period weight increases. In our animals reduction of hæmoglobin and loss in weight seem to occur at different stages, the former beginning with the experimental diet, and the latter probably a few weeks later, as with the Wisconsin animals. Further investigation of this discrepancy might throw interesting light on the connexion between growth-rate and hæmoglobin content. The slight fall in the hæmoglobin index of the series on dried milk is also probably not significant, since it is known that the infantile level is distinctly higher than the adolescent.[5] The differences in the iron and copper contents of the two diets are shown in the accompanying table (expressed as parts per million of liquid milk used).

	Iron.	Copper.
Raw milk (*a*) ..	.. 1·5 to 2·0 ..	.. 0·4
Dried milk S.G. (*b*) ..	.. 5 ..	.. 0·23

(*a*) Iron taken as 1·5 to 2·0 mg. per litre. Copper taken as 0·4 mg. per litre, an average of the figure given as average by Supplee and Bellis [6] and the figure found by Hart.
(*b*) Figures from determinations in samples of actual powder used.

In the next table are given the actual average weekly intakes per animal of iron and copper respectively in the two series, based on the analytical figures given in the previous table.

	Iron (mg.).	Copper (mg.).
Raw milk ..	.. 0·5 to 0·7 ..	.. 0·13
Dried milk S.G. ..	1·7 ..	.. 0·08

According to the Wisconsin workers the weekly requirement of copper by young rats on a milk diet is 0·06 mg. This was doubled in the case of our raw milk diet and cannot therefore have been the limiting factor, as witness the lower intake on the dried milk, which brought about better or normal hæmatopoiesis, and was actually inferior to raw cow's milk as a source of copper. The low, though adequate, copper content of the dried milk S.G. is possibly associated with the fact of its careful conditions of manufacture in New Zealand, and also with the fact that in the process of humanisation some 30 per cent. of pure lactose is incorporated in it.

It appears, therefore, that the recognised low hæmatopoietic properties of milk solids can be materially enhanced by drying in the milk appropriate quantities of a suitable iron salt, and that in this way a dried milk may be prepared containing sufficient iron and copper to allow normal hæmoglobin formation in the young growing albino rat.

The feeding and care of the animals used in this experiment were undertaken by Miss E. Allchorne, and the hæmoglobin determinations were made by Miss V. Hazley, to both of whom I wish to express my thanks for their collaboration.

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CLINICAL AND LABORATORY NOTES

MANGANESE IN FOODSTUFFS.

ITS POSSIBLE RELATION TO CIRRHOSIS OF THE LIVER.

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THE association of cirrhosis of the liver with chronic alcoholism is plain enough, but there are many difficulties in the way of believing that the liver damage is caused directly by the alcohol. The Hursts [1] showed that manganese salts are particularly effective in producing experimental cirrhosis in rabbits, and it occurred to us that there might be some peculiarity in the diet of drunkards which led to their taking in more manganese than ordinary people. In particular we thought of the tasty addiments with which a fading appetite may be encouraged—pickles, winkles, anchovies, sauces, and such like.

Manganese is a widely distributed element and is present in varying amounts in most plants, particularly in the leaves of trees; hardly any is found in the substance of seeds. It does not accumulate in the bodies of vertebrates but some invertebrates contain considerable quantities. Thus, Bertrand,[2] insisting that it is a normal constituent of all animals, found about 0·02 to 0·07 * in the flesh of various animals, an indeterminate trace in cow's milk, and 13 in scale insects, 44 in crayfish, 11 in winkles, 15 in scallops, and 30 in a fresh-water mussel. Lindow and Peterson,[3] in a survey of foodstuffs, found from nil to 0·05 in fish and flesh, 0·9 to 1·2 in liver,† 0·5 in yellow corn, 0·4 in potatoes, and an average of 7 for leafy vegetables with a maximum of 22 in a sample of lettuce. Bradley [4] found as much as 1500 in fresh-water mussels (which are sometimes eaten, but are certainly not tasty) and quantities up to 3900 have been found in land mollusca, though the edible sorts of snails have only 10 to 20.[5] Hence, a diet made up of the normal staples would not contain much manganese except for vegetables; various curious substances might add a good deal.

Our estimations were made on material dried at 110° by the simple method given by Bradley (loc. cit.) which seems accurate enough for the purpose. The substance is ashed, melted with potassium nitrate, dissolved in nitric acid, and boiled with potassium persulphate and silver nitrate; the resulting permanganate is compared colorimetrically with standard solutions. The minimum amount detectable in this way is about 0·01 mg. so that, using about a gramme of material nil in our results means a content of less than 1 on our scale. We are much indebted to Dr. E. J. Allen, F.R.S., of the Plymouth Laboratory, and to Capt. G. C. C. Damant, R.N., for getting us material.

Our results, set out in the Table, entirely failed to confirm the guess with which we had started; the figures may, however, be worth putting on record. We were particularly suspicious of shell-fish which seem often to be sold outside public-houses, and it is true that winkles (3 to 16) and scallops (trace to 40) may contain considerable amounts with rather less in mussels and oysters. But cockles, whelks, and limpets showed none, and the following "relishes" gave negative results: Bisto, Gentleman's Relish, Marmite, tomato ketchup, essence of anchovy, salad dressing, O.K. sauce, chutney, pickles (3 sorts), lobster paste, mustard, capers and carroway seed. Spices, especially cloves, had more. On the other hand, tea-leaves (Indian and China) gave 27 to 43; an ordinary cup of tea contains in solution, about as much manganese (0·1 to 0·2 mg.) as six winkles, and 2 or 3 oz. of cabbage or lettuce would generally have as much. Taking into consideration the quantities of these different things which anyone is likely to consume, it looks as if a vegetarian teetotaller will probably take in more manganese than a heavy drinker.

	Manganese mg. in 100 g. dried.		Manganese mg. in 100 g. dried.
Winkle (*Littorina littorea*)	Tr. to 16	Tea	27 to 43
Whelk (*Buccinum undatum*)	Nil	Coffee	Tr. or nil
Purpura lapillus	Nil	Cocoa	Tr.
Trochus cinerarius	Nil		
Limpet (*Patella vulgata*)	Tr. or nil	Mixed spice	14
Crepidula fornicata	10 to 17	Cinnamon	2
Cockle (*Cardium edule*)	Nil	Ginger	4 to 12
Oyster (*Ostrea edulis*)	4	Coriander	10
Mussel (*Mytilus edulis*)	Nil to 4	Cloves	48 to 50
Scallop (*Pecten operecularis*)	Tr. to 40	Vinegar	1
,, (*P. maximus*)	5	Curry powder	4
		Olives (flesh)	6
Shrimp (bottled)	Nil to 4	Pepper	10 to 20
Prawn (bottled)	Nil	Cayenne pepper	2 or less

Tr. = trace.

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2. Ann. Inst. Past., 1913, xxvii., 1, 282; 1921, xxxv., 815; 1922, xxxvi., 230, 494.
3. Jour. Biol. Chem., 1927, lxxv., 169.
4. Ibid., 1907, iii., 151; 1910, viii., 237.
5. Naturalist, 1917, p. 11; 1921, pp. 135, 209.

INTRAVENOUS MORPHINE IN CORONARY THROMBOSIS.

BY FREWEN MOOR, *M.C.*, M.D. CAMB.

AT 1.15 A.M. on Sept. 6th, 1930, a man of 54 was awakened by violent substernal pain; he had a history of a similar attack in 1928, and when I arrived at 2 A.M. his wife had already given him two capsules of amyl nitrite, which had failed to give him any relief. He was very pale, sitting up in bed and moving about a good deal, not very dyspnœic, but obviously in great agony. The pulse was fairly strong, the pulse-rate 44, irregular, and the heart sounds barely audible. An injection of gr. ⅛ morphine with gr. 1/120 hyoscine failed to give him any ease in a quarter of an hour, so gr. ¼ morphine was injected intravenously. The effect was dramatic, and within half a minute the patient became quiet, complaining only of slight oppression beneath the upper part of the sternum; the pulse-rate was 66 and regular. He went to sleep almost at once, and awoke six hours later with slight substernal discomfort, which lasted for three days; no further morphia was needed.

At 9.15 A.M. next day the pulse-rate was 48, mostly regular, and the heart sounds were normal; the blood pressure, which in April, 1930, had been 174/90, was 108/80. During the day the temperature rose to 100·6°, and remained raised, 102·2° being reached on the fourth day. Three days later the pressure had fallen to 96/60, and a polygraph showed incomplete

* Mg. per 100 grammes dried material—i.e., parts per 100,000; we use this notation throughout.

† cf. Titus Cave and Hughes (Jour. Biol. Chem., 1928, lxxx., 565, and 1929, lxxxiii., 463) on the use of manganese as a supplement to iron in the cure of nutritional anæmia in rats. Bertrand also noted the relatively large amount in liver.

heart-block. Auricular contractions were plainly heard in the longer pauses at the apex; the apical first sound was reduplicated, and the first half of the reduplication had exactly the same muffled quality as the sounds heard during the pauses, so that I wonder whether audible auricular beat is the true explanation of the split first sound so often heard in cases of myocardial degeneration. The a-c interval varied from about 0·2 to 0·35 second, thus accounting for the great irregularity of the pulse, which at first suggested auricular fibrillation; some ventricular beats were missed altogether, some were normal in time, and some were delayed.

On the fifth and seventh days pericardial friction was heard, the loudest point being in the fourth space at the left sternal edge; it consisted of a loud, short rub preceding, but separated from, the first sound, and a fainter rub coinciding with the first sound. At the apex the first sound was reduplicated, and I feel certain that the roughened surface was mainly over the auricles. His recovery has been uninterrupted, and now (seven weeks later) he is beginning to get up.

I think the diagnosis of coronary thrombosis, partially involding the bundle of His, is reasonably certain on clinical grounds. I do not know whether the intravenous method of giving morphine is altogether safe, but it was certainly most effective in this case.

Westgate-on-Sea.

MEDICAL SOCIETIES

MEDICAL SOCIETY OF LONDON.

AT a meeting of this Society held on Oct. 27th, the President, Dr. R. A. YOUNG, being in the chair, Sir ALMROTH WRIGHT, F.R.S., gave an address on the

Prophylactic and Therapeutic Values of Vaccines.

He reminded his hearers that it was now 28 years since he wrote his first paper on vaccine therapy, and that in it he had suggested that the physician of the future would be an immunisator, by which he meant he would be a vaccine therapist. To-day he would reconsider this position, and see whether anything had to be taken away from, or anything added to, what was then said.

FOUR METHODS OF TREATMENT.

Sir Almroth discussed four methods of treatment. One was the expectant method, in which the doctor did nothing but looked on. The second method was to carry out surgical extirpation, such as for tuberculous glands; he had seen streptococcal glands extirpated. The third method, which was being introduced at the time of his first lecture, was that of serum therapy—i.e., the injection of blood derived from animals which had been copiously inoculated. The fourth, that in which the profession had most confidence, was treatment by antiseptics. Nothing further need be said about the expectant method; it was due to callousness, or pessimism, or defeatism. Extirpation was introduced by surgeons and was given up by them. It had been assumed that the whole of the bacterial infection could in this way be got rid of, but when it was found that the patients required further operation, the second coming quickly after the first, surgeons discarded that means. The next method, that of serum therapy, had justified itself in connexion with diphtheria antitoxin, and it was assumed, by a process of generalisations of ignorance, that what happened in the case of diphtheria could happen in regard to any other microbial disease. As to the antiseptic method, a little more had to be said. The laboratory study ot antiseptics was initiated when he was in South Africa, and people treated cases of pneumonia by giving creosote and other antiseptics by the mouth. To test the matter he took creosote and other antiseptics, and added them to blood containing pneumococci, and in each case the microbes grew as well when the antiseptics were added to the blood-serum as when they had not been added. At that time a new method came out, chemotherapy, and one of the drugs prepared was optogen, which was said to be very efficacious in killing the pneumococcus. He found that this, even when diluted to 1 in 400,000, did its work in this respect very effectively. The antiseptic method was applied largely in the late war, but it made the wounds no better. That was because the fluid was a corrupted fluid; trypsin corrupted the lymph, and every microbe multiplied in those wounds. These he called purulated unrestricted bacterial infections.

There were two methods of treating wounds which gave good results, in that they got rid of this purulated infection and reduced it to a restricted serophytic infection, and these he grouped together. One was his method of putting a salt solution into the wound, the result being a great flow of lymph, killing all microbes in the wound except the streptococcus and staphylococcus. Even these grew only in small numbers in serum which came fresh from blood-vessels. The other method which was successful was Carrel's method. Carrel worked with surgeons at the front, who extirpated all the putrid portions of tissue as soon as the wounded came in, and kept the wounds clean by giving perpetual irrigations of hyperchlorides. In both these methods staphylococci and streptococci remained behind; both caused a flow of serum into the wound, and so the methods could be bracketed together. When a wound was in a condition when there was a restricted culture of serophytes, and the serum had got its normal properties, the wound could be closed. He had never yet met a serum which was effective in killing microbes when added to normal blood. Prof. A. Fleming, at St. Mary's, had devised three methods which ought to be taught in every medical school, methods which demonstrated that the introduction of antiseptics into a wound or into blood fluids or into lymph did nothing but make the conditions worse. These Sir Almroth set out in chart form. He suggested that the profession should go to the Minister of Health and say: "As this method has been proved wrong, would it not be well to try to teach people so, and issue a command?" In the past, Government forbade people to inoculate small-pox into others, and they might forbid the antiseptic treatment in the same way. The profession could not do it, because it had taught the public to use antiseptics, and, if a doctor refused to use them, a change of doctor would ensue.

BACTERIOPHAGE AND CHEMOTHERAPY.

The speaker, having found that the other methods must be discredited, said: "Let us try to immunise." Since then, two methods had come up: (1) chemo-

therapy, started by Ehrlich, and (2) bacteriophage. There was a bacterial diastasis which had an action on microbes, and the method consisted in taking a staphylococcus culture, one which dissolved of itself. When inoculated it contained derivatives of the bacterial culture and something which dissolved them. If good results followed inoculation of the mixture it could be attributed to the lytic power in it, or to the fact that there were bacterial elements in it. So that at present it could not be distinguished from active inoculation, except that Carrel had published a paper concerning what he did in India in cholera. He gave the worst cases a teaspoonful of bacteriophage to cholera, and they practically all got well; at any rate, the mortality came down from 60 to 6 per cent., as was testified by three men, a great achievement. It was yet early to say that this applied to all diseases. A more interesting process was chemotherapy, which was an improved form of antiseptic treatment. Ehrlich always had the idea that if he could find a substance which had a specific action on a particular microbe being dealt with and leave the body unaltered—i.e., which would not kill the man but would kill the microbe—it would be useful. Sir Almroth wished to speak of three of these agents. The first was "606." Ehrlich had sent him some of the first batches manufactured, and when the drug was applied to some cases of syphilitic rupia in the wards in two days the rupia was gone or greatly improved, and the streptococci were dead. It might be said that the syphilitic spirochæte was killed, and therefore the streptococcus died a natural death—a difficult doctrine. Or it could be said that the substance killed the streptococcus as well as the spirochæte. This doctrine was worked on and tested during the war by Dr. L. Colebrook and Capt. S. R. Douglas. They found that "606" exerted a lethal action in serum upon the staphylococcus and streptococcus. But in chemotherapy it was not a mere question of finding that substance which, put into serum, would kill the microbe; it had to be proved in the blood also, and one had to ascertain whether it killed white corpuscles as well as the virulent organisms. It had to be decided how high in strength one could go without poisoning the white corpuscles, and how long this must be in contact with the organisms to kill them without corpuscle damage. It was found that this drug did kill streptococci, but it took three hours of contact to do so. And the strength had to be only just short of that which would kill the corpuscles. There was no drug which would kill the microbe only without poisoning the white corpuscles. Moreover, owing to contact with the body fluids, it was difficult to maintain the drug at the strength at which it was put in. In the case of optogen, used against the pneumococcus in South Africa in a dilution of 1 in 400,000, this killed the organism in serum, but when applied to patients with the disease it did not give striking results. It apparently acted also on the eyes, and there were cases of temporary blindness following its use in pneumonia cases. The path of the chemotherapist would be a very complicated one. During the war it was suggested that flavine might be used for killing microbes in wounds, but Prof. Fleming found that though it did not kill white corpuscles instantaneously, if the blood was cooked for a few minutes it destroyed the white corpuscles. When flavine was put into a wound it was picked up by muscle, which it stained yellow, and by dressings and by various tissues, and much of its power was lost in that way.

VACCINE THERAPY.

Thus was the profession thrown back on this method of immunisation or vaccine therapy. Here was a larger scope for dealing with patients. The more thoughtful members of the profession did not use a drug because they had heard of a case in which it was successful; they asked to know the principle on which the drug was recommended and what laboratory work justified it. When the speaker introduced vaccine therapy, he asked whether he could settle a principle for it, reflecting that tissues which were locally infected were doing their best to kill the microbes there, but all the other tissues in the body were idle and not participating in casting the intruder out. He would now state the case somewhat differently. It was necessary to devise a method to show that phagocytosis, which had been thought to be only an agent for killing microbes, was activated by the vaccines; and for that purpose the opsonic index was developed. At that time he tested only the serum, not the white corpuscles, because he had satisfied himself—erroneously—by experiments on people who had only local infections, that the white corpuscles did not vary, but the serum did. He thought it safer to test the effect of every inoculation, and he carried out this laborious process, doing in hospital some hundred thousand tests. Much was learned from this work as to dosage; for instance, if the dose used were too large, a negative phase resulted, and there would be less phagocytosis afterwards. To a healthy man any dose could be given without killing him, even without producing a negative phase. But to a man already ill, and therefore having already a large supply of microbes, the dose given must be small. The smaller the infection a man had, the larger the dose which should be given him. Not infrequently, in the case of tubercle, the patient with a high opsonic index died, and that showed there was some element in the matter not understood. Then Shattock and Dudgeon wrote a most important paper on vaccine therapy. They tested pyrexial cases, testing corpuscles and serum separately, and they found that when people had fever the white corpuscles often lost their phagocytic power. Therefore one must take into account the leucocytic efficiency as well as the power of the serum to aid phagocytosis. Progress had now gone so far that it was no longer necessary to test the blood in routine cases; and in testing the bactericidal power confirmation was obtained. But in dangerous cases some help was required to know whether or not active immunisation could be applied. When the conditions were favourable and there was a purely surface infection, where there was an uncorrupted serum and the white corpuscles had access to every part, complete results could be obtained. There remained the case in which ideal conditions did not exist for killing the microbes—namely, where there was a surface infection and there was no pool of serum available, but only a mere film over thes urface. In infections one could not trust to phagocytosis being complete, and he submitted that vaccine therapy was useful in conditions in which physiological results would not be obtained.

Where should vaccine therapy be applied, and what ought to be done in the cases in which it was not applicable? Obviously it should be used in incipient infections and localised infections. There was a large class of patients in every casualty department, who had septic wounds which were treated by opening up the wounds and applying antiseptics. He thought one was entitled to look to the machinery

of Government and ask that they should ordain that antiseptics should be given up and vaccines used in those cases. And there was the kind of case having a prolonged infection, grave cases which might affect the highest in the land. These seemed to be treated by the expectant method, probably because those in charge did not want to take the responsibility of doing vaccine therapy. The expectant treatment might or might not succeed; what was required was to apply to these patients the best possible method.

DISCUSSION.

Prof. JOHN EYRE considered that the antibodies which were stored up in the system and were liberated as a result of vaccine therapy still had their work to do, in spite of the prominence now given by Sir Almroth to the leucocytes; the lecturer seemed now to be unduly deprecating his earlier work.

Dr. H. H. MILLS remarked than an increasing number of people now asked for vaccination against catarrh and colds in the autumn, and it was probable that the general results must have justified this increasing popularity of the process. Probably it was on the principle that if a multivalent vaccine was used, one of them would hit the target.

Dr. GEOFFREY MARSHALL said that prophylaxis against infection occurring after inoculation had proved a remarkable success; the almost complete absence of enteric fever among our troops in the late war must be attributed to vaccine inoculation. Vaccines had also been used on an enormous scale in the treatment of toxæmic diseases, such as pulmonary tuberculosis. The evidence in favour of the use of tuberculin had been, he considered, dubious, and the same could be said of vaccines in toxæmic diseases.

Mr. HAROLD DODD said he had seen very good results from mercurochrome, but he had had great difficulty in knowing when to apply these further agents. He asked what was the best wound dressing for surgical cases with cellulitis and a profuse discharge, also with septicæmia, and when ought chemotherapy or transfusions to be used.

Dr. C. W. BUCKLEY spoke of having for several winters used the St. Mary's Hospital vaccines against catarrh, and at first he seemed to get good results. Second visits also gave good results, but should patients return for the course on a third occasion, the result was the reverse; a negative phase was set up, and an acute catarrhal attack followed. In vaccinating against boils he had noted a similar failure on a third injection. A similar failure occurred in later uses of manganese, and the same could be said of inoculations of the regulation commencing dose of 5 to 10 millions of *Streptococcus viridans* for infective arthritis; but he had better results when he commenced with half a million.

Sir WILLIAM WILLCOX alluded in warm terms to the work of Sir Almroth Wright in teaching the profession sound conceptions of disease. He spoke in detail of conditions in which the body was sensitised, and in which, therefore, vaccines should not be used. Instances were exophthalmic goitre, gouty conditions, and asthma. Vaccines had a profoundly beneficial effect in prophylaxis, as shown by statistics concerning typhoid fever, plague, and cholera. Before using vaccines it was of great importance to investigate whether there was any focus of infection in the body and to deal with that. In such conditions as arthritis he did not think of using vaccine until a thorough overhauling had been carried out.

Mr. E. B. WAGGETT asked whether in chronic focal infections there was any merit in the use of vaccines before operation. His feeling was that it was better to get rid of the focal infection first. He had seen cases of dental sepsis in which serious symptoms, including mental ones, followed the use of a minute dose of vaccine.

Prof. A. FLEMING gave a general account of the recent work, illustrated by instructive cases from his practice.

Mr. ZACHARY COPE emphasised the importance not only of excision of an infected focus, but also of incision to liberate toxic products; this often set the patient well on the road to recovery and enabled him to make use of his own powers of healing.

The PRESIDENT was much impressed with the value of tuberculin as used by his surgical colleagues in localised forms of tuberculosis, but he was anxious about it in medical cases. In the latter domain the number of tuberculin preparations was very large. He paid a tribute to Sir Almroth for the great work he had done for medicine.

Sir ALMROTH WRIGHT replied at some length. Pulmonary tuberculosis, he said, was a disease with many foci, and hence the dose given must be very small. Koch, unfortunately, gave maximum doses, but though Koch was a great man he was the worst conceivable clinician. He thought that to take out many teeth at a time, or the tonsils in the case of a heavy infection, was a hazardous proceeding. He thought that in the future there would be dissolved vaccines available, so that dosage could be standardised.

ROYAL SOCIETY OF MEDICINE.

SECTION OF PATHOLOGY.

A MEETING of this Section was held on Oct. 20th, when Prof. E. H. KETTLE delivered his presidential address on

The Relation of Dust to Infection.

He said that hitherto the pneumonoconioses had received little attention, but it was evident that their importance was increasing.

The disease in its most concentrated form was best seen in the gold-mining industry of South Africa, where in the last 20 years £12,000,000 had been paid in compensation to silicotics, mostly Europeans, and their widows and children. In recent years an initial medical examination designed to exclude all but picked men from employment underground, periodical examinations of workers, and the enforcement of measures improving working conditions had cut down the incidence of pneumonoconiosis considerably. But the industry was still faced with outstanding liabilities, in respect to miners who might be expected to develop the disease, which were variously estimated at £6,000,000 to £11,000,000.

In Great Britain, he said, the dust risks were shared among a number of industries in different parts of the country. Excluding coal-miners, some 35,000 workers were employed in the refractories industry, tin-mining, the pottery industry, metal grinding, sandstone working, sand-blasting, and other trades in which dust is a prominent feature. It had been common knowledge for years that these trades are dangerous, but the first scheme of compensation for silicosis only came into operation in 1919, and there could be no doubt that the industrial pulmonary diseases would bulk much more largely in our social and medical legislation in the near future. All dangerous dusts had one factor in common: they

all contained free silica, the dioxide of silicon, and the degree of harmfulness of a dust was generally held to depend upon the amount of free silica present in it.

Although the pulmonary disability induced by the different dusts had received various names, the terminal pathological condition was always the same; the victims died with advanced pulmonary tuberculosis. Pathologists were, therefore, confronted with two main problems: first, how does silica affect the lung, and how may its action be prevented or modified; and, secondly, how does it influence the development of pulmonary tuberculosis? In practice these problems were closely associated, but it was essential to make some attempt to separate them.

HOW DOES SILICA AFFECT THE LUNG?

The lung in uncomplicated silicosis presented a variable picture, but the characteristic feature consisted of the presence in the lung substance of isolated nodules of fibrous tissue, varying in size, number, and distribution. Massive fibrosis was rarely seen nowadays; usually tuberculosis supervened as a frank, possibly a modified, infection. Though in most forms of chronic fibrosis some reasonable account of the development and progress of the lesion could be given, the stages of the development of the pulmonary lesions in silicosis were not yet explained.

Until comparatively recently it was generally held that silicosis owed its harmful properties to its physical characters. The hard, sharp particles were supposed to damage the pulmonary tissue, and the whole process was regarded as a kind of microscopic trauma. For some years now, however, the view that silica becomes soluble in the tissues, and that its action is chemical rather than physical, had become generally accepted. It was also generally accepted that dust inhaled into the terminal alveoli was phagocytosed by the pulmonary macrophages and transported to various parts of the lung. Presumably the silica gradually became dissolved, and in its soluble state was able to stimulate the growth of fibrous tissue.

Experimental investigations had not, as yet, helped much in the elucidation of the process, and this was not for want of time or trouble. It was in the more complicated forms of the disease that experimental investigation was most needed. Silica in harmful dusts was always associated with other substances, and the way in which these adulterant dusts might modify the main process could only be studied experimentally. The statistics of certain dusty trades suggested that, although the workers are exposed to a high percentage of silica, they do not suffer from silicosis. It had often been stated that there is no silicosis in the mines of Mysore in India and in Cripple Creek in U.S.A., and the conclusion had been drawn that the adulterant dust in these regions prevents the accumulation of silica in the lungs. It emerged at the recent International Silicosis Conference in South Africa, however, that there is plenty of silicosis at Cripple Creek, and that as regards Mysore accurate information is lacking. Similarly, the low incidence of tuberculosis in coal-miners had been taken as an indication that no silicosis occurs among them, the anomaly again being explained on the assumption that the adulterant dust (in this case coal) removes silica from the lung. Prof. Kettle had not been able to demonstrate any difference from the normal in their reaction to the tubercle bacillus of animals saturated with carbon in attempts to block the reticulo-endothelial system. Dr. N. Tattersall had now shown that silicosis does occur in coal-miners—at any rate among the men who work at hard headings—and the so-called anthracosis of coal-miners was probably silicosis affecting an anthracotic lung. Moreover, Prof. E. L. Collis had pointed out that in certain districts the tuberculosis incidence was actually higher among coal-miners than in the general population. The demonstration of silicosis among coal-miners was of importance because a whole superstructure of theory had been built up on the assumption that it does not exist.

INTRATRACHEAL INJECTIONS.

During the last year, with Dr. R. Hilton, Prof. Kettle had attempted to produce silicosis by introducing suspensions of dust directly into the lungs of rabbits and guinea-pigs by intratracheal injection. So far they had not been able to produce the typical fibrosis, and since an adequate quantity of dust must have been introduced into the lung it was clear that the time factor is of the first importance. This had been recognised by L. U. Gardner, of the Trudeau Sanatorium at Saranac Lake, who had exposed his animals to dust for eight hours a day for two to three years, and had obtained important results. The intratracheal method had, however, enabled them to study the histology of lungs injected with carbon in the form of dilute Indian ink, and with mixtures of amorphous silica and carbon and mine dust and carbon. Prof. Kettle showed figures taken from the lung of a rabbit which received two intratracheal doses of dilute Indian ink at an interval of 58 days, and was killed 147 days after the last injection. Carbon particles were still present in the alveoli, and the appearances closely resemble those seen in figures from lungs of animals injected with the heavily pigmented South African mine dust. No sign of "cleansing" of the lung from carbon had been evident. He had no reason to believe that coal dust or any other adulterant dusts in industries played any specific part in protecting the individual from the effects of inhaled silica. The possibility that concomitant dusts might actually assist the action of silica must also be considered. Prof. Kettle had been privileged to examine the lungs of one of the cases of acute silicosis described in THE LANCET (Oct. 18th, p. 846), and also another fatal case from the same factory. He had found advanced tuberculosis in both cases, and this he regarded as the basis of the whole condition, though it was more than likely that the infection was enhanced by the inhaled silica. In dusting experiments he had not been able to demonstrate any difference between the changes produced by the inhalation of pure amorphous silica and the same dust mixed with sodium carbonate.

EFFECT OF SILICA ON PULMONARY TUBERCULOSIS.

Though inhaled silica might produce a fairly advanced fibrosis of the lung, the chief danger lay in the influence the dust exercised on microbic infection. There was abundant clinical evidence that silica had a specific action on the growth of the tubercle bacillus. It was formerly supposed that it was the fibrosis induced by the silica that in some way or another predisposed the lung to tuberculosis, presumably from interference with lymphatic drainage. In Prof. Kettle's view the fibrosis had no significance at all, and the only thing that mattered was the nature of the dust. No experiments had been carried out in this country on the infection of the fibrotic lung, but fairly extensive observations have been made on the effects exercised by silica on tuberculosis in laboratory animals. With W. E. Gye, Prof. Kettle had shown several years ago that inoculation of

different forms of silica produced characteristic necrotic lesions, and that tubercle bacilli proliferated readily in these lesions in such insusceptible animals as mice. Later, he had been able to show that the active growth of the bacilli did not depend merely on the necrosis of the tissue, but was due to the actual presence of the silica. He described in detail further recent experiments which confirmed this view. Gardner had performed an experiment which seemed to be crucial. At Saranac a very mild strain of tubercle bacilli, R 1, was cultivated, which produced in guinea-pigs infected by inhalation pulmonary lesions which healed in one to two years. When animals infected with this bacillus were dusted with quartz, massive ulcerative lesions occurred and the infection spread. This change was not due to an exaltation of the virulence of the bacilli, for subinoculations from the animals produced merely the form of tuberculosis characteristic of the R1 strain. It appeared to be due to an alteration of environment, dependent on the presence of the silica.

Exactly how the silica acts was still doubtful. Prof. Lyle Cummins had suggested that it destroyed complement; but to Prof. Kettle the phenomenon appeared to be a cellular rather than a humoral one. Either the intracellular defensive mechanism of the phagocyte was injured by the silica or the nutritional value of its cell protoplasm for the bacillus was enhanced. In vitro, when silica was added to culture media, the total growth of the bacillus seemed to be unaffected; but sometimes the lag period seemed to be shortened, so that an abundant growth was obtained much earlier than in control tubes. Prof. Kettle concluded by referring to the puzzling condition described by South African workers under the name of infective silicosis.

SECTION OF EPIDEMIOLOGY AND STATE MEDICINE.

AT the meeting of this Section held on Oct. 24th the presidential address was delivered by Prof. MAJOR GREENWOOD, who took as his subject

Professorial Conscience.

The professorial conscience, he said, might be at rest provided the professorial duties were efficiently performed, and he proposed to discuss the conditions of efficiency. He defined epidemiology as the study of disease imposed by focusing the attention, not upon the sick individual, but upon the group; a deliberate mental hypermetropia. As one of a medical family, he said, he was not likely to under-estimate the value of medical experience, which would save a man many statistical and epidemiological blunders. Nevertheless, an undergraduate training in medicine was very far from being an ideal preparation for the study of epidemiology. The majority of his pupils and junior colleagues during the last twenty years had not had a medical training and their work had not been inferior to that of the medical pupil. So far as the future of epidemiological research or teaching was concerned, it was a matter of relatively minor importance whether qualified doctors were attracted to this branch or not. Able young people with any sort of scientific education would do. In practice, however, the majority of pupils would continue to be medical graduates with all the virtues and vices of their training. On the virtues he need not enlarge—the schooling in exact observation of particular facts, the subduing of the most thumby fingers to the precise execution of delicate tasks—but he must emphasise the vices. As a class these graduates were as helpless as children in conducting an argument in general terms. While this was no doubt partly due to illiteracy, it was largely to be ascribed to the emphasis laid in medical teaching upon the practice of an art. Busy practical men gave admirable instruction in the ritual of sacrificing tonsils or appendices, but they could not be expected to enter largely into the question of whether the hecatombs of tonsils and appendices offered up year by year were a sacrifice pleasing to the gods of health. There was sound reason for this. Give a young man plain rules when to remove an appendix; make sure that he could operate—or telephone to somebody else who could—and the odds were that he would save some lives which would otherwise have been sacrificed. That he might as a set-off be manufacturing a number of incurable psychoneurotics was a remote consideration. He had not to strike the balance; the epidemiologist had, and had to explain to him that all epidemiological conclusions were based upon a weighing of probabilities. It was the duty of a teacher to inculcate in the epidemiological field the methods of a judge in equity. There was, however, a danger of changing the pupil from an irrational dogmatist into an ignorant sceptic. When the student had been convinced that much of what was believed and used as justification for acts of sanitary administration had no secure logical basis, it must be made equally clear that, while for all men conscious logical reasoning was the principal instrument and for most men the only trustworthy instrument of finding the truth, yet great men attained great truths by other means. It was right to expose the sham; it was wrong not to give equal prominence to the inimitable element. A lad who modelled himself on Simon's writings and neglected strict logic was in danger of becoming an uplifter; if he cultivated logic alone and sneered at uplift he was in danger of becoming a prig. Students should be taught social history showing why the statistical method, which confessedly ignored much truth, was an indispensable aid to study.

EDUCATION AND PUBLIC HEALTH.

The greatest enemy was time; when were the students to find time to reflect? The public health curriculum was overburdened and better educational results would be obtained if some specialisation were permitted. Education and technical instruction were muddled up in university education. Those who were to spend their lives in the public health service needed both, but the technical knowledge which was at once essential and capable of being learnt in a university school was not very extensive. Students were being taught more bacteriology, chemistry, and statistical epidemiology than would enable them to ask intelligent questions of experts, but not nearly enough to give them a real command of the technique. Most of what was taught had institutional value—as pure mental culture—or had no value at all. The primary duty of university teachers was institutional, not technical teaching, and the present legal requirements made it hard for them to perform that duty well.

The public health service attracted neither the able adventurer nor the budding scientist; it attracted those who were looking for something relatively safe in an insecure world. Hence its average student would be characterised neither by special natural ability nor by more than average scientific culture. Yet the scientific spirit was an essential of first-rate work in the public health service. Some men could be imbued with the scientific spirit in a bacteriological laboratory; others might make cultural progress if they were given time to read history or do sums for

themselves. Both groups might attain a fair measure of scientific culture if they were allowed to follow their natural bents, but they were not allowed to do so. All were stretched out alike on the Procrustes bed of curriculum. The law forbade the attainment of the ideal of education. An armchair reformer might propose as a remedy that quite a low minimum of technical knowledge should be established for the entrant to the public health service, and that, after a preliminary test of this kind, he should devote a year to studying one of the series of branches—e.g., (1) chemistry and physics, (2) bacteriology, (3) epidemiology and statistics, or (4) public administration. His final examination would be confined to the chosen group. In practice, if such a scheme came up for consideration, it would at once arouse conflict between eminent leaders of different groups, each of whom would have a set of facts in his own subject which he would be convinced every student ought to know. In the end the fine British spirit of compromise would, as usual, prevail and the examination would be much what it was now. Nor was any legal remedy possible, because the minority who really cared about education were utterly powerless. We were determined not to admit that the reason why there was no flood of highly educated persons, now that education was free to all, was simply due to the fact that the proportion of highly educable persons in the nation was extremely small. We dared not say that very little knowledge over and above what every medical student knew was enough to fit a man to be a mere hewer of wood and drawer of water in the public health service, while the qualities which fitted a man to rise much above that level were the undemocratic inborn privilege of less than one man in a thousand. The valid answer to this pessimism was that the one-in-a-thousand man was indeed the salt of the earth and that to encourage and foster him it was wise to permit much waste. When teachers and examiners were the same persons—if they were worthy of their office—even much worse regulations than those of the General Medical Council were not insuperable difficulties.

CONDITIONS FOR TEACHING.

The most serious difficulty of the present position was to determine what more could be done for the men who were the salt of the earth. We all knew that the intercourse between a young keen-minded man and an older man of ability was one of the most valuable and beautiful things in life; only when the solemn nonsense of professor and student was dropped and comrades were working side by side could the net of truth be woven. We all knew this, but—we were professors in a modern university. The report of the University Grants Committee quoted the words of an eminent man of science who had found himself reduced to the activities of a shop manager and was fain to point out the obvious and therefore wholly ignored fact that research was not a piece of knitting which could be dropped and picked up at odd moments. Very few men could do first-rate work amidst petty interruptions. Unless some via media could be found between scholarly insouciance and the present position, when the duties of the university professor were taken to be to sit in his private room with his window open for every ass in the metropolis to bray through, and, between listening to successive brays, to dictate letters to more distant asses, nothing but stark poverty would force men into university life. Some of the blame lay at the doors of the professors themselves, and a positive prohibition of any duties other than those of the chair itself—an absolute exclusion from international organisations and expert committees—might help the tender-minded. Unfortunately there was a lion in the path: over-capitalisation. Important people had to be convinced how busy and useful to them the professor and his staff were; they wanted results and had not the least interest in thinking for its own sake. Only along the lines of exceptional endowments, such as the Yarrow professorships, could the future of really first-class teaching be saved.

SECTION OF MEDICINE.

A MEETING of this Section was held on Oct. 28th, when the chair was taken by the President, Dr. R. A. YOUNG, and Dr. J. A. RYLE opened a discussion on

Research in Clinical Medicine.

He said that he presumed that the main motive for this debate was a prevailing sense of dissatisfaction with present achievements or conditions. It would be no exaggeration to say that all were alive to many disturbing and retrograde tendencies in modern medicine. Early specialisation, new physical and chemical methods, and commercial therapeutic enterprise had hampered the natural evolution of common observation and common sense, and fostered an uncritical attitude and an empiricism unworthy of the age. The time had come for a reawakening of interest in medical philosophy. Research in clinical medicine was not pathological, bacteriological, or biochemical research; it was rather a branch of the science of human biology which studied the behaviour of man in disease. Its methods were both observational and experimental. Great scientists, wherever possible, had employed both methods, but with the growth of the ancillary sciences of physiology and pathology there had been a tendency in medicine towards a division of labour. Scientifically, it had been the misfortune and not the fault of the physician that he had always had to expend a disproportionately large part of his energy in the treatment and management of patients. Nevertheless, some of the greatest contributions to physic had been due to practitioners of medicine. The days of the observational school were by no means numbered. The fields open to the observational physician were many and varied, while the scope of experiment must be limited by the dictates of humanity. The use of instruments of precision did not turn observation into experiment; the difference lay between studying casual experiments of nature and promoting small scale experiments of one's own. Just as the modern trend in animal biology was the study of behaviour, ecology, and genetics in the open, so the next trend in clinical medicine would be the study of behaviour, personality, idiosyncrasy, vital reactions, and genetic factors in living patients, with experimental inquiry running a coöperative parallel course in the hands of an expert few.

SCOPE AND OPPORTUNITIES.

The task of the clinical observer was not nearly ended. The wide realm of subjective symptomatology was still largely unexplored. More accurate information was needed about nausea, heartburn, the dyspnœas, and many varieties of ache in body and limb; about symptoms as expressing particular disturbances of function; and the influence of constitution on the incidence and course of chronic diseases. In therapeutics there was much to be done, but almost more to be undone. It should not have been necessary to wait a quarter of a century to discover by slow and bitter experience that the greater part of vaccine therapy was a delusion unworthy of a

scientific profession. It should be possible to decide in a comparatively short time what was good and what bad in serum treatment, chemotherapies, and endocrine preparations. The principles of prognosis should become more surely established, and in the realm of morbid psychology there was ample scope for further research. Moreover, many diseases of obscure causation were worth studying for their own sakes as natural phenomena.

It was undoubtedly true that provision and encouragement for the young clinical research worker were at present inadequate, but it was doubtful whether "curative" and "progressive" medicine could ever be divorced. No one could conduct research on patients not under his own care and no one could research on patients without treating them. It should, however, be possible to relieve a promising man of the necessity for private practice and of crippling routine, but there was no short cut to becoming a physician and the research worker could not profitably be relieved of his apprenticeship of out-patient work and ward teaching. Dr. Ryle would like to see an occasional vacancy for an additional assistant physician, to be filled only if a man of outstanding merit were forthcoming. The post should supply a general out-patient day, a few beds, access to all material in the hospital, and permission to see private patients referred by colleagues. The appointment should be for five years, renewable indefinitely or convertible to an ordinary honorary assistant physicianship, and the salary should be commensurate with that of junior professorial rank. The applicant should have held house appointments and a medical registrarship or tutorship, or have had a period in general practice or in some special institution. Credit should also be given for a broad education, particularly in philosophy or psychology, for qualities as a physician or naturalist, and for a scholarly heredity.

THE SYNERGISM OF LABORATORY AND CLINIC.

Prof. HENRY MOORE stressed the importance of the observational method, and said that clinicians, coming to think of disease in terms of physiology, had themselves introduced the more precise methods of the laboratory into the wards. Disease must be studied where it occurred—in the patient—by the man who handled disease, using all available means, laboratory and clinical; but complicated problems which could be solved by observation alone were calling more and more for close coöperation between the bench and the bedside. The key to the situation was the synergic working of laboratory and clinic as one unit; from collaboration of this kind had resulted many of the greatest discoveries of recent years, for instance the use of insulin in diabetes and of liver in anæmia. There was, however, a lack of facilities for work of this kind at present. The ideal hospital would be designed with four principles in view: (1) the treatment of patients; (2) efficient investigation of patients by all suitable means; (3) the teaching and training of students, post-graduates, and nurses; and (4) social service and after-study. The clinical research worker should hold a whole-time appointment, giving him security and leisure for thought, teaching, and research. He must guard against arrogance and against neglecting the art of medicine for science. Staff meetings, local medical societies, and the study of current literature should keep him out of a groove. He need not necessarily make his observations in the research clinic; he might have to work in the field or the general hospital. He must have training in the laboratory and in animal experiments, followed by simple research under suggestive rather than restrictive supervision. Whole-time investigators had contributed so much in recent years that their number must increase. The only justification for the part-time worker was to give a man in practice the opportunity to test a promising hypothesis; men who could do good work under these circumstances were few but should not be overlooked. Some organisation was needed at the present time to promote research in clinical medicine. Former participation in a piece of clinical research ought to be a consideration when appointments were being made.

LACK OF ENCOURAGEMENT IN GREAT BRITAIN.

Dr. HELEN MACKAY said that it had been alleged that clinical research workers in this country were taking a relatively small part in the advancement of knowledge. There was plenty of talent, but workers were discouraged by the absence of prospects of a livelihood, and the work was carried out largely by those who earned their living by other means. All clinical research must make heavy demands on the time, energy, and thoughts of the worker, yet scholarships and grants offered only a fraction of the minimum salary available in public health appointments. A small remuneration in early years would not matter if there were any prospects for the future, but all the subsidies were temporary. Stable salaried posts should be available for work in any institution, and the worker must have charge of hospital beds and out-patients so that he could control his material. He needed also the sympathy and assistance of his medical, nursing, and lay colleagues. Research in some hospitals was limited or impossible because of the attitude of the lay board. On the Continent there were many full-time salaried appointments in university clinics in small towns with ample laboratory and library facilities.

DISCUSSION.

Dr. PARKES WEBER questioned whether British medical workers set a real example in clinical research, and whether, until they did so, they had a right to ask the lay world for large donations. He instanced the multiplication of text-books, and the lack of monographs and of a microscopical museum analogous to a library. There was insufficient coöperation between clinicians and laboratory workers.

Dr. C. M. WILSON did not believe that men were prevented by the claims of practice from exercising creative ability. What was lacking was the fundamental training in physics and chemistry, and the remedy was the whole-time unit system. The numerous problems of clinical medicine demanded a precise answer, and for this reason many people believed that the future lay with the laboratory rather than with the clinician.

Dr. A. EIDINOW drew the distinction between original discovery and routine scientific investigation. The latter was valuable, but often done by men without medical qualifications, and the doctor who took it up must be prepared to give up his original profession and train as a laboratory worker. It was, however, of the utmost importance to design some scheme to help original discovery which should be open to anyone capable of it.

Prof. LEONARD FINDLAY declared himself unable to understand the attempt to distinguish between the research worker and the clinician. Laboratory work was still clinical medicine. The trained worker might do good routine investigation, but was not for that reason a suitable person for generous subsidy. A research worker, like a poet, was born, not made,

and there was a great deal yet to be seen if we had the men to see it. Much of the best research of the past had been done by men in general practice—for genius flourished with adversity—and these men made the most stimulating teachers.

Dr. G. W. THEOBALD urged the impossibility of doing research while rushing about London to appointments at various hospitals. The work was all done by whole-time workers. It was no use patching the system; it needed remaking. When England had first-class hospitals in small towns, on the Continental plan, research might begin.

Dr. KINGSTON BARTON emphasised the importance of treatment, and of the great progress of teaching hospitals during the last 50 years.

Dr. W. R. COLLIS said that every young man was faced with the problem of whether it was better to go into practice or go into debt. The clinician and the laboratory worker could no longer be divided. At present the man who spent any time in a laboratory was held by clinicians to be unfit to see a case, whilst the man who visited the out-patient department was viewed askance by his laboratory colleagues. Abroad, a man was expected to divide his time equally between the two branches, and development along these lines was essential for the future.

REVIEWS AND NOTICES OF BOOKS

Problems and Methods of Research in Protozoology.

By Various Contributors. Edited by ROBERT HEGNER, Professor of Protozoology, and JUSTON ANDREWS, Associate in Protozoology in the Johns Hopkins University School of Hygiene and Public Health. London: Macmillan and Co., Ltd. 1930. Pp. 532. 21*s*.

IN the period following the late war the study of parasitic protozoa has attracted increasing numbers of investigators in America. Many of these have contributed materially to our knowledge, have introduced new methods of investigation, and have entered hitherto unexplored fields. Their results and technique have been published in widely scattered journals, so that it has not always been an easy matter for workers in other countries to obtain the desired information.

In this book the editors, who are amongst the foremost workers in this subject in the American schools, have presented to readers a series of articles by eminent American protozoologists, each one a specialist in his own line. The authors have been well chosen and have given clear and concise accounts of the present position of the particular aspects of the subject on which they write. Their own results are described, as also their methods of investigation and the problems which still await solution. Since the book deals mostly with the work of American investigators, the title is misleading, for subjects not studied by the authors receive little or no attention, though they are amongst the most important. Thus the great problem of human and animal trypanosomiasis, apart from that of rats, is not considered. Similarly piroplasmosis, leishmaniasis, and other subjects are omitted entirely or receive only a cursory mention. But the book contains a vast amount of very valuable and useful information, which it would be difficult to obtain elsewhere, on problems and methods of research in those branches of protozoology which have been studied by American investigators. B. D. Reynolds has given a very important account of ectoparasitic protozoa and this alone will be of the greatest service to those who wish to study these organisms. H. Kirby's account of the intestinal protozoa of termites, J. F. Kessel's chapter on the methods and problems of cross-infection experiments, H. Ratcliffe's on the effect of changes in diet on intestinal protozoa, C. F. Craig's on the cultivation of *Entamœba histolytica* and serological studies with this parasite, M. M. Metcalf's on the Opalinidæ, F. O. Holmes's on the protozoa of latex plants, J. Andrews' on the coccidiosis of birds and mammals, R. R. Kudo's on the myxosporidia and microsporidia, W. H. Taliaferro's on serological methods, and finally L. J. Reed's on statistical matters are most instructive and valuable contributions. As a connecting link between groups of articles the first of the editors has written introductory chapters which do much to blend the material presented. The problems which await solution are detailed. This method of approach reaches its climax in the article on bird malaria where a series of 76 specific problems is listed. It would have been quite easy to multiply this number by ten, but the most striking feature of the list is that it could have been made applicable to any infection, whether animal or vegetable, and is not peculiar to malaria.

Those who wish to obtain an insight into the methods and results of American protozoologists will get it from this book.

The Urticarias.

By EDOUARD JOLTRAIN, Director of Clinical Research at the Paris Cochin Hospital. Paris: Gaston Doin et Cie. 1930. Pp. 417. Fr.40.

THE author's preface of 49 pages, which is reproduced verbatim from an address delivered in 1929 at Madrid in honour of his chief, the late Prof. Fernand Widal, concerns itself with the life and work of that great master, and dedicates the book to his memory. A brief introduction of the subject, which is recognised to be of ever-increasing importance, is followed by a description of the histology and of the clinical varieties of the urticarial syndrome. The common evanescent and figurate type, the papular, vesicular, tubercular, hæmorrhagic, and bullous types, strophulus or lichen urticatus, urticaria pigmentosa, giant urticaria or Quincke's œdema, pseudophlegmonous and gangrenous varieties—all these are grouped together and separately described from the clinical aspect. Interesting as such a morphological classification will always be, Dr. Joltrain contends that it is of much greater importance to elucidate the causes which underlie these clinical manifestations, and he examines the position mainly from this point of view.

A historical résumé of the classic contributions of Widal, Abrami, Brissaud, and Joltrain on the mechanism of anaphylactic shock, and its concomitant manifestations in the blood (hæmoclastic crises), the blood pressure, the temperature, blood coagulability and albuminuria, is exceedingly well compiled and lucidly explained, and forms an admirable introduction to this long clinical study of the various forms of the disease. The classification of the many ascertained causes of the syndrome, based on

the modern theory of sensibilisation, include, first of all, protein antigens absorbed from the commoner articles of our daily diet. Fish, eggs, milk, chocolate, bread, farinaceous and other foods, beer, wines, &c., find a place in the list, and examples of such susceptibilities are freely quoted. Other substances discussed are drugs, such as antipyrin, opiates, arsenic, mercury and bismuth, cod-liver oil (not so infrequent since this drug began to be used in the treatment of varicose veins), veronal and insulin, and, lastly, dust inhalations and microbic foci which, according to this author, are rarely the cause of urticarial symptoms. Urticaria a frigore and the conditions due to solar and actinic rays of various types are also dealt with. Fatigue and emotional disturbances, which every physician recognises as at least a predisposing factor in the individual attacks, receive ample consideration; and, finally, there is a most welcome chapter on treatment, for urticaria can tax our therapeutic resources to breaking point.

It was a sound idea to summarise modern conceptions of urticaria in this way—the subject certainly deserves the labour that has been expended. The only point on which the work can be criticised is the complete omission of the discoveries of Sir Thomas Lewis on the local mechanisms involved in the characteristic manifestations. His name does not even appear in the large bibliography of 35 pages which precedes the index. The omission is really serious in a text-book of so extensive a character, and in a subject which Lewis has done so much to clarify.

Chronic Nasal Sinusitis

and its Relation to General Medicine.

By PATRICK WATSON-WILLIAMS, Consulting Surgeon in Diseases of the Ear, Nose, and Throat, Bristol Royal Infirmary. Bristol: John Wright and Sons, Ltd. 1930. Pp. 221. 15*s*.

IN this book Dr. Watson-Williams discusses the systemic effects of nasal sinus infections. He is not here concerned with acute sinusitis nor even largely with profuse chronic suppuration, but deals especially with those "low-grade" infections which produce little local disturbance and are often difficult to detect, but which may, and do, cause severe disease from toxæmia and from the metastasis or spread of organisms to various parts of the body. There is of necessity some overlapping in a discussion of this subject, for such "focal sepsis" may have its origin in other regions beside the nasal sinuses, for instance, in the teeth, the gastro-intestinal or the genito-urinary tract; on the other hand, some of the effects described are not due so much to focal sepsis as to direct extension of the inflammation, as in some orbital and ocular affections.

The first part of the book deals with the general aspects of focal sepsis and contains some interesting paragraphs on the selective affinity of certain organisms and their toxins for particular organs, which may help to explain the very various symptoms of sepsis in individual cases. The author next discusses the effects of focal sepsis on the different parts of the body; this section includes some remarkable observations on the relation of chronic septic infection to insanity, a subject which has attracted increased attention during the last few years. Numerous clinical records are recounted in this part of the book. In the chapter on orbito-ocular complications we would have welcomed a more precise statement as to what diseases of the eye may be produced by focal sepsis and in what proportion of cases, for instance, is retrobulbar neuritis likely to be due to nasal sinusitis. Dr. Watson-Williams reports cases of this disease which have recovered after exploring the sphenoidal sinus, a circumstance by now very well known, but does not explain that many cases recover either spontaneously or after exploration of an apparently healthy sinus, or after removal of part of a middle turbinal. It is thus possible that the local blood-letting acts beneficially, or that a particular patient would have recovered without any intervention. This criticism may be extended to the chapters on other regions. It is by now generally recognised that the nasal sinuses are a source of focal sepsis, and attention might be more profitably directed to considering the relative extent of their influence, and of other sources of sepsis, on the diseases of various organs.

The second part of the book is concerned with methods of diagnosis and treatment. The author finds the endorhinoscope of great value in disclosing appearances suspicious of sinusitis, especially in latent cases where the secretion and other signs of inflammation are very scanty. But his chief diagnostic weapon is the valuable method of "exploral suction" which he introduced many years ago, by which the secretion from a suspected sinus is sucked into a syringe for bacteriological and cytological examination. A remarkable statement is that many of these low-grade but chronic inflammations of a nasal sinus can be cured by a single "disinfection" or washing out with an antiseptic, such as 1/10,000 biniodide of mercury.

The aim of the book is to fill a clinically important gap between the general text-books of medicine, which devote little space to diseases of the nose, and the books on rhino-laryngology, in which the systemic effects of nasal sinus infections receive but scanty mention; it will be of interest to the general physician as well as to the laryngologist.

Les hypotensions aiguës et subaiguës.

By M. A. DUMAS, Médicin des Hôpitaux, Professeur Agrégé à la Faculté de Médecine de Lyon. Paris: Masson et Cie. Pp. 163. Fr. 30.

THIS small book deals very completely with a subject which, although a most important one, has been pushed into the background by its more spectacular opposite hypertension. The author presents hypotension as a clinical entity and as a symptom in the course of another disease when this demands immediate treatment as soon as it is recognised. A clear and helpful distinction is drawn between acute, subacute, and chronic hypotension. It is shown that these three states are entirely different, pathologically, ætiologically, and clinically, and, more important still, that each requires different forms of treatment. Another interesting division is made according to whether the hypotension is cardiac in origin, as with the low pressure associated with cardiac infarction, or whether it is vascular in origin, as in conditions of shock or intense pain; with the recognition of these two distinct sources the treatment again differs fundamentally. In the section devoted to the study of hypotension as a symptom in the course of another disease, we are given, in explanation of certain untoward events which may happen in the course of an illness, and of the treatment adopted empirically for their alleviation.

The section on treatment of hypotension as a whole is inadequate, but the book will, however, be read with interest by those who are not sufficiently familiar with the condition to recognise the varied guises in which it may manifest itself.

PANEL AND CONTRACT PRACTICE

THE PANEL CONFERENCE.

THE representatives of the Local Medical and Panel Committees met in London, at the British Medical Association House, on Oct. 23rd. Dr. H. J. CARDALE took the chair for the first time.

Certification in Pregnancy.

Last year the Insurance Acts Committee (I.A.C.) was asked by the Conference to consider the suggestion that it should be lawful for a medical practitioner to give a certificate to a woman when he considered her so far advanced in pregnancy as to be unfit for her employment, and that such a certificate should be sufficient warrant for the payment of insurance benefit until the end of pregnancy. It was also suggested that a special certificate should be introduced for this purpose. The I.A.C. had found it impossible to support these proposals; in moving the adoption of the paragraphs of the report which dealt with these points, Dr. H. G. DAIN, chairman of the I.A.C., said that the Committee was convinced that it was not in the best interests of the service to proceed with these suggestions. An amendment was brought in, however, by Dr. W. STEVEN for the West Riding of Yorkshire, stating that a woman who had reached the eighth month of pregnancy was bodily disabled, and requiring that the panel practitioner should supply her with a certificate to that effect at the end of the seventh month. In Yorkshire, he said, a large proportion of the women worked in factories, and might be seen late in pregnancy lifting heavy bales of wool. There was no uniformity in the treatment of these women by their societies; the larger societies sent a woman to the regional medical officer as soon as she was certified, while the smaller societies often met the claim at once without question. There was also a want of uniformity among the doctors, some giving certificates as early as the fifth month, and some declaring the woman unfit, not owing to pregnancy, but owing to some symptom, such as varicose veins; as a result the second woman might receive benefit at the fifth month or earlier, and the other be refused it on the grounds that it was too early in her pregnancy. Though it was not always possible to say definitely when the eighth month had arrived, it should not be difficult to keep within a margin of error up to about three weeks; a second certificate should be supplied if necessary.

Dr. J. S. MANSON, for Warrington, still considered that a special certificate would be useful, as the condition was not one of illness, and its certification under another heading would help to reduce the inflated sick benefit claims of the last few years. Dr. Dain said that the patient was entitled to sickness benefit on the grounds of incapacity for work, and the proposed plan would limit her to one month's benefit only during pregnancy; this was unreasonable. Each case must be decided on its merits, every factor, including the nature of the work, being taken into consideration. The approved society undertook the final responsibility of deciding whether the patient was unfit for work or not; under the proposed plan, if the patient developed pneumonia she might exhaust all the benefit to which she was entitled at the beginning of pregnancy. The amendment was not passed, but the paragraphs embodying the opinion of the I.A.C. were adopted.

CHANGE OF DOCTOR.

The principle of free choice of doctor, in panel as in private practice, was the subject of a resolution submitted by the Conference to the Minister of Health some years ago. The report of the I.A.C., in the paragraphs referring to change of doctor, gave a brief review of the regulations which have obtained at different times since the passing of the National Health Insurance Act; from 1913 to 1919 an insured person could only change his doctor once a year, at the end of December; from 1920 to 1923 he could change half-yearly; from 1924 to September, 1927, at any time; and from October, 1927, until the present, at any time upon giving a fortnight's notice, unless both the doctors concerned agreed to an immediate transfer. Dr. DAIN, speaking on this point, submitted to the Conference a letter dated Oct. 18th, 1930, from the Ministry of Health; in this was quoted a resolution requesting the adoption of a quarterly method of transfer, recently placed before the Minister by a conference of the approved societies and friendly societies. The Minister, Dr. Dain said, hoped that the Panel Conference and the I.A.C. would be able to concur in the suggested amendment of the regulations, and it was therefore necessary to consider the position again very carefully. He proposed that the Minister should be asked to refer the whole question for a year. The reason the change had been suggested was because of the great increase in sickness benefit during the last five years, which had been attributed in part to lax certification; it had been said that when the patient could change at a moment's notice his doctor dared not refuse certificates. There was evidence, however, that the increase in sickness benefit was due to an abnormal experience of non-fatal sickness of an incapacitating nature spread over several years. This wave had reached its crest in February of last year, since when there had been a decline. There were good grounds for asking that there should be no change for another year, until it was seen whether further events would bear out this experience. It was against the interests of both patient and doctor that such a change should be made.

Dr. G. F. WHYTE, for Dundee, introduced an amendment suggesting that there should be a return to the half-yearly system, on the grounds that it was more satisfactory from an administrative point of view; at present there was an interminable process of note-writing and postage, which was extremely cumbersome. The resolution put before the Minister by the friendly and approved societies contained a provision for immediate transfer of patients if they were able to show legitimate reason for the change; he considered that this provision should not be included in any change of scheme; the right of transfer by consent only should be required. In the Dundee area during 1922, when the half-yearly system was in force, there had been approximately 1000 changes; during 1927, when the change could be made at any time, the number made was 5000; in 1929, under the present system, there had been about 2000. He agreed with the principle of free choice, but the patient had no right to grumble if he could change at the half year, and had the right of transfer by consent of his doctor at any time. Dr. J. MCNAMARA, for Nottinghamshire, was also opposed to the provision in the resolution of the approved and friendly societies to which Dr. Whyte had taken exception; his

constituents supported the Dundee amendment. Dr. J. W. BONE, for Bedfordshire, was heartily opposed to a return to the half-yearly system. The approved societies, he said, desired the change because it meant a simplification of administration; and because it was hoped that if it was more difficult to change doctors there would be a reduction in lax certification, and hence in sickness benefit. These opinions were no concern of the medical profession, and though the Minister might impose the change on the profession, he should not receive its support. He would prefer to see the patient at liberty to transfer at any time, but if he were sent automatically to a medical referee on making the change there would be no danger that he would seek a more amenable doctor on being refused a certificate.

The Conference did not support Dundee, and, swinging the pendulum in the opposite direction, an amendment was introduced by Carmarthenshire, recommending a reversion to the regulations of 1924 to 1927, when a patient could make a fresh choice of doctor at any time. Dr. BONE pointed out that it would be uncommonly awkward for the I.A.C., having received one proposition for consideration from the Ministry of Health, to be forced to reply with a suggestion which was the exact reverse. An appeal to the Conference to support the view of the I.A.C. was made by Dr. H. B. BRACKENBURY; the Minister of Health, he reminded members, could still impose the change immediately if he wished, but the Conference was at liberty to ask him to postpone action for some months. There were two reasons why transfer at fixed periods, with notice, was a bad thing: first, because it was against the principle of the medical profession requiring the free choice of doctor and patient; and secondly, because it would fail to have the desired effect; the change of system was not directed against lax certification, if that existed, but against the doctor's fear of losing his patient by transfer. There was no reason to suppose that a doctor would be any happier at losing his patient at the end of the quarter than at the end of 14 days. But although most members would prefer that the patient should be at liberty to change at a moment's notice, it was not a suitable time to introduce a resolution on the point to the Ministry, and he asked the Conference to support the proposal of the I.A.C. After a little more discussion the meeting passed to the next business, which was a motion introduced by Dr. H. N. BARON, for East Suffolk, to the effect that the regulations for change of doctor from approved institutions should be the same as those which apply in the case of change from one doctor to another. The general opinion among speakers, however, was that these institutions were dying out, and that it was unnecessary to take any decided step in the matter. Dr. DAIN said that as they were run by lay committees they had the right of canvassing for patients, while the practitioners in the neighbourhood had no fair means of combating this. As there were only eight or nine such institutions in England it was not worth while to run the risk of stirring up ill-feeling. The Conference rejected the motion, but upheld the proposal of Dr. Dain that the Minister should be asked to defer for 12 months the consideration of any modification of the regulations for the change of doctor.

Preparations not Ordinarily Regarded as Medicines.

Dr. DAIN moved the approval of the part of the report of the I.A.C. dealing with the draft articles issued from the Ministry of Health on the definition of drugs. The advisory committee appointed by the Minister have included in their second report a list of substances which they have classified as "never drugs," "sometimes drugs," and "always drugs," but there is nothing mandatory in this classification. Should any substance come into question the case may be referred to the panel committee; should the findings of the panel committee not be accepted, either by the practitioner, the pharmaceutical committee, or the advisory committee, the question can be referred for decision to referees nominated by the Minister, of whom at least one shall be a medical practitioner. If it is finally decided that the substance is not a drug, the cost can be reclaimed from the practitioner who prescribed it. Dr. D. O. TWINING, for Devonshire, proposed that no practitioner should be liable to be surcharged with the cost of a substance before an official decision had been reached as to the category to which it belonged. It was unjust, he considered, that the practitioner should be penalised to the extent of paying for the preparation, when the committee whose business it was to draw up a schedule were themselves undecided into which class it fell. Dr. H. C. JONAS supported him, but Dr. DAIN considered that the point was too small to justify any attempt to change the regulations; according to his estimate, it might cost one practitioner out of those present the sum of sixpence once in ten years. The chemist also deserved consideration; he was not allowed to refuse to supply any preparation prescribed by the doctor, but it would be unjust to insist on this, while warning him that in the case of any doubtful substance he would be unable to recover the cost if it was decided that it was not a drug. If the chemist accepted the responsibility of supplying the drugs the doctor must accept the responsibility of ordering them. The amendment was lost and the paragraphs in the report adopted.

A motion not on the agenda was introduced by Dr. PEARSON, for Birkenhead, suggesting that when a practitioner had been reported to the Ministry on a question of prescribing, he should know in what form he was reported, and should receive a written reply stating whether his explanations had been satisfactory. Dr. DAIN said that practitioners were already supposed to receive this information; Dr. PEARSON, however, had encountered a case where no official intimation was received, and his motion was carried. The paragraphs on doubtful drugs in the report of the I.A.C. were then approved by the Conference.

Additional Benefits.

Dr. E. R. FOTHERGILL, for Brighton, moved that the fullest opportunity should be given for the consideration of all regulations and proposals having reference to additional treatment benefits before their final adoption. There was bound, he said, to be a great development of such benefits in future, and he thought the I.A.C. should not be allowed to disintegrate, but should persist as a supervisory committee to consider anything done under the Insurance Act. Consultants were innocent persons and apt to fall into pitfalls when dealing with the approved societies; if additional services were to develop, any regulations made between the consultants responsible for those services and the approved societies should be criticised by the I.A.C. in the interests of the panel practitioner. Dr. BRACKENBURY agreed with the spirit of this motion, but was doubtful of the form; the I.A.C. had made arrangements for an additional benefits subcommittee, largely composed

of consultants, and there would be opportunities for the consideration of rules and regulations by both the committee and the subcommittee. Some alteration in the constitution of the Conference must be contemplated if specialists and consultants were to have the opportunity of voicing their view. The Conference felt with Dr. Fothergill, however, that it was unnecessary to face the problem for the moment, and the motion was passed.

Dr. J. O. SUMMERHAYES, for East Sussex, seemed to have suffered from the disappearance of his patients for months at a time into sanatoriums, rheumatic clinics, and other haunts of special forms of treatment; subsequently they returned to him without bringing any official information on what treatment they had received there, or what course of life it was now advisable for them to follow. He was not, therefore, felt to be unreasonable when he suggested that the rules of ethics of consultation, as adopted by the British Medical Association, should be made to apply to all questions having reference to treatment additional benefits. The panel practitioner, he said, was like the donkey in the East—grossly overloaded. But there was one Eastern donkey who had turned, and that was Balaam's ass; he had not only refused to go any further, but had taken the occasion to speak pretty plainly to his master. It was time the panel practitioners followed his example, and addressed the Ministry of Health on this matter. Dr. DAIN quite agreed that a report should always be furnished to the practitioner, but he thought some form of report would also be necessary for those who were paying for the treatment of the patient; the rules of ethics of consultation would require revision as they did not cover this second point. Dr. Summerhayes' motion was carried.

Treatment of Insured Persons in Hospitals.

The question of the admission of patients to hospital wards under the care of their private practitioner was introduced by Dr. L. G. GLOVER, who proposed that the I.A.C. should take such action for the furtherance of this object as might be necessary. The body of opinion among members of the Conference was strongly in favour of the allocation of hospital beds to panel practitioners for the treatment of their patients; Sir RICHARD LUCE said that the best opening lay in the smaller hospitals and possibly in the council hospitals under the Local Government Act, but that the only way in which an entrance could be gained was by bringing local opinion to bear. Dr. GLOVER pointed out that if a footing was to be secured in the council hospitals the effort must be made this year, before any particular plan had been adopted by the local authorities. Dr. H. S. BEADLES and Dr. H. C. CRAVEN VEITCH feared that if doctors followed their panel patients into hospital voluntarily it would in time become an obligatory part of their duties, while Dr. I. G. MODLIN disapproved, on principle, of any man doing work for the State or for a municipality without being paid for it. All other speakers, however, were heartily in favour of the motion, which was carried, though the particular line which the I.A.C. was to follow in furthering this object was not made very clear.

Range of Service.

Dr. FOTHERGILL last year introduced a motion laying it down that when it has been decided that an operation or other service is outside the scope of a practitioner's obligation it is no concern of any committee or authority to decide that the practitioner who renders the service has appropriate skill or experience; this year he returned to the charge, and asked why, since the motion had been passed, the I.A.C. had not taken the necessary steps to have the regulations amended. Dr. BRACKENBURY replied that almost all the members of the I.A.C. had agreed that it was impossible to introduce this statement to the Ministry. If a doctor considered a particular service was outside his contract he could decline to perform it, and his decision would be considered by the proper tribunal later. If, however, he undertook to perform it for a fee as a specialist service, he must be able to prove himself a specialist in respect of that service. Dr. JONAS supported Dr. Fothergill on the grounds that once a service was recognised as being outside the panel contract it was outside the purview of the Ministry; but Dr. DAIN pointed out that decision lay, not with the Ministry, but with the representatives of the panel practitioners. It was not desirable to limit service to the smallest amount that any one practitioner was competent to do; the aim was to provide a full general practitioner service. He quoted the case of a doctor who purchased an ultra-violet ray lamp, and wished to give specialist service and charge fees; the I.A.C. had been able to insist that he should take a course in the subject before he could regard himself as a specialist in it. Dr. Fothergill's arguments were not accepted by the Conference.

Dependants of Insured Persons.

Dr. DAIN, for the I.A.C., moved:—

"That the time is now ripe for the medical profession to ask for the inclusion under the National Health Insurance service of the dependants of insured persons, provided that such an extended service include adequate safeguards respecting remuneration and conditions of service."

He wished to explain why the I.A.C. felt it to be a suitable moment to suggest a scheme which must lead to the expenditure of much public money. The passing of the Local Government Act pointed to a wide public demand for a complete medical service; the medical profession would be called upon to help to decide whether the extension should be by means of specialist services given at clinics and welfare centres, or by an extension of general practice. It was the opinion of the profession that the public would receive better service from the family doctor, and the Committee had decided that the time had now come to press for the inclusion of dependants. Other countries were not all taking this line; in parts of the United States there were no general practitioners. If the opinion of the Conference was in favour of a general practitioner service they must press forward now, or the population would divide its allegiance between the clinics and the doctors. It did not make for efficiency to have different branches of the doctors' work absorbed elsewhere.

Dr. J. D. WELLS, for Essex, thought the I.A.C. was trying to rush fences. The time was not yet ripe for the inclusion of dependants, because the service given under the National Health Insurance Act had not yet reached the standard originally promised. To ask for an extension, moreover, implied that the profession was perfectly satisfied with the present terms of service, which was not the case. Dr. L. J. PICTON, for Cheshire, supported him; if the extension were made, he thought, the doctors would be overwhelmed with work, and an increase in personnel would be necessary which it would take time to supply. In the meantime there would be dissatisfaction among the patients, and appeals to the approved societies to find some other means of providing attendance—perhaps by a State medical

service. Dr. C. W. SOMERVILLE said that he had seen extreme suffering among the wives and children of miners, and that in Midlothian they had felt the time was ripe for this step for the past 16 years. To practitioners it would mean the end of many bad debts. The friendly relations between doctor and patient were, in the opinion of Dr. W. HAIG, bound to disappear if a State medical service ever came into being.

Dr. PETER MACDONALD thought that this was the most important subject before the Conference. In York, panel practitioners were not in favour of the inclusion of dependants because of the increased work involved, and because they considered that the need was met in other ways—namely, by clinics—in their area. Dr. J. G. MCCUTCHEON said that when the transference of powers to the local authorities took place in Scotland, much perturbation was occasioned in one area because a whole-time medical officer was appointed to look after the dependants of those who could not afford to pay for medical services. He, personally, now saw less than one twenty-fifth of the cases of sick children that he had seen on first going into practice; a practitioner's work was bound to deteriorate if robbed of regular experience. In the opinion of Dr. A. W. HOLTHUSEN, the rush of work at the outset of a scheme to include dependants would quickly settle down to a steady level.

Dr. BRACKENBURY reminded the meeting that this motion had been passed by the Representative Body at the annual meeting, and said that it was important that it should now go forward as the opinion of the whole body of panel practitioners. He called attention to the wording of the motion, which did not say "the time is now ripe for the inclusion . . . ," but "the time is now ripe to ask for the inclusion . . ." Obviously the change could not be made in a moment, but it was important that the profession should make a statement of opinion now. Otherwise a different method—presumably a State medical service—might be adopted. Dr. SUMMERHAYES pointed out that more work would mean more pay, and considered that the early congestion of work would settle down in time. Dr. J. A. PRIDHAM was able to foresee other advantages; the tiring and often fruitless task of sending out small accounts would be avoided. Moreover, the doctor would be in a better position to prevent disease, because he would see it in the early stages. Chronic otorrhœa might be prevented by timely incision of the drum. The good effects of preventive measures would react throughout his practice, because the children he attended now would be the insurance patients of the future. Whoever brought forward this suggestion at the present time would receive the credit for it, and he would like to see that credit come to the medical profession. The motion was carried with only ten dissentient votes.

A Direct Attack.

Dr. C. C. MORGAN, for Chester, drew attention to certain headlines which appeared in the *Manchester Guardian* of Sept. 29th, and which quoted from a speaker at the National Conference of Friendly Societies, who referred to the "inefficiency of panel doctors." This speaker, who was the president of that conference, stated that "there are too large a number of medical practitioners whose treatment of insured persons is perfunctory and negligent, and some who are willing to do almost anything in order that they may secure a cheap popularity, and a long Panel List, even to the extent of assisting persons to obtain benefit to which they are not justly entitled." Dr. Morgan said that this constituted a direct attack on the profession as a whole, and that slanderous accusations of the kind did an incalculable amount of harm. It was the doctor's business to decide whether the patient was fit for work or not. He moved that the Conference should express strong resentment of the slanderous statements concerning panel practitioners made at the annual meeting of the National Conference of Friendly Societies.

Dr. DAIN said that the medical profession had been made the scapegoat for the increase of sickness benefit. Statements of the kind quoted were based on false deductions. There was an average limit to the duration of illness, and often a patient would recover in the interval between being referred and the occasion of his appearance before the regional medical officer. It had been estimated that the panel doctor's decision was actually reversed in only 16 per cent. of cases. The profession had always stood for improvements in the service, and it was unfortunate that such people as Dr. Graham Little and Lord Riddell should make statements without actual basis in fact. The service given to the panel patient was the best type of general practitioner medical service in the world, though there was little opportunity to say this publicly or in the press. He did not know whether the motion brought forward by Chester was the best form in which to couch a protest. Dr. E. K. LE FLEMING did not think the Chester motion, as it stood, would enhance the dignity of the Conference; he thought that practitioners should take every opportunity in public and in private to put forward sound reason against such attacks. At his suggestion the Conference proceeded to the next business.

Statistics.

Dr. DAIN spoke on the importance of amassing reliable statistics of National Health Insurance practice during the coming years; as their greatest value would lie in continuity, an amendment was withdrawn which suggested that any area which furnished 100 per cent. quota of statistics should be exempt from producing any more for a period of two years.

Dr. H. J. CARDALE was the only nominee for the position of chairman in the coming year.

SCARCITY OF HOUSE SURGEONS.—At a court of governors of the North Devon Infirmary at Barnstaple recently it was stated that additional expense had been incurred by the necessity of obtaining a locum tenens to do the work of house surgeon. It was added that "the young medical men who used to come forward to fill the positions of house surgeons in provincial hospitals come no more."

MERSEYSIDE HOSPITALS COUNCIL.—The second annual report of this council records substantial progress. The number of members of the contributory fund is 245,000, and the income is £140,000. The estimated revenue for 1929 was £100,550, and the amount received £124,151. At the close of 1928 there were 153,142 contributors. A year later this number had gone up to 217,393, employed in 3178 establishments. A sum of £91,506 was distributed to voluntary medical institutions, of which £3100 was earmarked for medical staff funds. A grant of £1968 was made to the Radium Fund, and £1784 was spent on the new ambulance service. A sum of £24,198 was paid to poor-law and unassociated hospitals for services rendered to contributors to the fund, and the work of the convalescent and after-care department was extended in coöperation with some of the approved societies. It is, however, pointed out that although the penny-in-the-pound scheme has been so successful, it does not meet the cost of services to contributors.

THE LANCET.

LONDON: SATURDAY, NOVEMBER 1, 1930.

HEALTH INSURANCE OF DEPENDANTS.

THE representative body of the British Medical Association agreed in July with a resolution of its executive council that the time is now ripe to ask for the inclusion of the dependants of insured persons under the national health insurance scheme. In many industrial areas there is little or no private practice among these dependants, they simply attend clinics and hospitals: only by their inclusion in a national scheme can they be brought under the care of the general practitioner. The cost of such extension of the insurance scheme was estimated by the Royal Commission of 1926 at £9,500,000, but as has been pointed out in the Association's proposals for a general medical service for the nation (p. 42) there are considerable set-offs to this cost, for money would be saved on existing maternity and child welfare services, and on the medical and dental treatment of school-children—a fact which was clearly recognised at the recent annual conference of health insurance committees.[1] Whether the panel doctor will welcome the enormous addition to his responsibilities which the care of dependants will imply is a ruling factor in the decision.

The answer to this question was given last week at the panel conference, a report of which appears on another page. Given adequate safeguards in respect of payment and conditions of service all but ten of the 200 odd representatives pledged the willingness of their local medical and panel committees to work such a scheme whatever its implications. That it will in fact add enormously to the responsibilities of general practice was emphasised at the conference by a representative of Cheshire. Fewer students are entering the profession of medicine of late years, and it is conceivable, he said, that there might be a definite lack of qualified practitioners to undertake the work at the outset. He was pessimistic enough to assume that the service rendered would be so inadequate that the approved societies would appeal for a full-time State medical service as an alternative; his fear was not generally shared however, though other objections to the motion were raised. In York even the threat of a State medical service seems to produce no terrors; practitioners there are apparently content that dependants of insured persons should either come to them as private patients, or that they should attend the municipal clinics—but this view is exceptional. There was a widespread feeling evident at the conference that a complete medical service was inevitable in some form and that medical men, both for the advantage of the patient and in the interest of the profession, should be the first to instigate a practicable system, and to receive any credit that might arise. The courage of those who were anxious for a compromise was restored by the chairman of the B.M.A. Council who pointed out that to ask for the inclusion of dependants was not necessarily to be given it, and that in any case the change could not occur in the twinkling of an eye. A representative of Essex was among the unconvinced, and had there been no threat of State-controlled medicine to consider, his arguments might have carried much weight; the present insurance service, he said, had not yet reached the standard contemplated when the first Act was passed, and it would, he thought, be better to do one thing well before undertaking any fresh responsibility. To ask for an extension was to give the unfortunate impression that the present terms of service were satisfactory to panel practitioners.

Speakers from areas of industrial depression had seen enough suffering among women and children to convince them that the time had already come for an extension of the insurance scheme to include them; and other delegates, though they admitted that there would probably be an excess of work for practitioners at the outset, felt that it would not be long before this settled down to a steady rate. More work, it was sagely remarked, would in any case receive the compensation of more pay. Other advantages were visualised as a result of the change. The representative of Dorset mentioned the valuable opportunities for practising preventive medicine which might arise if patients were seen early. Cases of otitis media, he said, seen in the early stages when the drum could be incised, would be cured before they developed into the chronic type of otorrhœa which wasted so much of a practitioner's time. Eventually preventive measures such as this would react on the whole of his work, because the children treated now would become the insured persons of the future. The chief reason for the introduction of the question at the present time was stated by the chairman of the Insurance Acts Committee when he said that the passing of the Local Government Act was a sign of the public demand for a complete medical service; it was the opinion of the medical profession that such a service could be given best by the family doctor rather than by an extension of clinics and welfare centres. In some parts of the United States, it would appear, the general practitioner is almost extinct. As an illustration the case was quoted of an American patient with gastric ulcer who had visited every available consultant who specialised in his condition. When asked what his family doctor thought of him he was clearly at a loss, and on being pressed with the question: "You know: the man you visit first?" he replied, "Oh, you mean my cheiropractor." The story indicates, not only the extreme to which specialism may be carried, but the very real danger of a patient being split up into his component parts according to his systems. A general medical

[1] See THE LANCET, Oct. 18th, p. 878.

service based on an extension of clinics would rob the patient of his great safeguard of being considered as a whole by his family doctor. This it may be taken was one of the principal reasons that the panel conference came to the decision that it did. However reached the decision was a momentous one.

ELECTRO-SURGERY.

ALMOST from the dawn of surgery the cautery has been used for the searing and cutting of pathological tissues, especially with the object of preventing bleeding. It was in 1893 that Prof. PAUL OUDIN demonstrated in Paris the removal of superficial growths by high-frequency current, and for the last ten years surgeons in the United States and on the Continent have been using electrical cutting instruments carrying high-frequency current generated by modified radio-transmitters. In Germany the preference was for a current of about 8000 alternations which produced much coagulation, while American practice tended to concentrate on greater frequency with a more rapid cutting of the tissues. At the Erlangen Clinic Dr. R. DYROFF has recently been using [1] a frequency of 50,000, with a technique much more closely resembling that of HARVEY CUSHING, in operating on regions where oozing of blood has in the past hindered the work of the surgeon. A discussion at the Royal Society of Medicine early this year,[2] introduced by Mr. JOHN ANDERSON of Dundee, suggested that the possibilities of these currents have not yet been fully exploited nor their properties known with any great accuracy. In this country until fairly recently, surgical diathermy has been used chiefly for the destruction of tumours in the bladder and the removal of malignant growths in the buccal cavity. With the development and production of machines which are capable of furnishing more rapidly alternating current than have hitherto been in existence it has become possible to use a fine-pointed electrode as a cutting instrument. So easily and with such a narrow zone of destruction on each side does it cause the tissues to part along the course it is made to travel, that the term "diathermy knife" has been coined to designate such an electrode. This severance of tissue by an electric arc, for the "knife" does not actually make contact with the part, has been held to have two great advantages—namely, the sealing of blood-vessels and limitation of hæmorrhage, and a similar coagulation of the lymph spaces by which the spread of cancer cells may be blocked. A bloodless field immensely facilitates surgical work; it has prompted the use of a tourniquet for many limb operations and in gastro-intestinal anastomoses. A method which would divide tissues without loss of blood and at the same time not necessitate interference with the circulation through neighbouring areas would be enthusiastically practised by the ordinary surgeon.

This millennium, however, is not yet. Machines available in this country furnish currents rather uncertain in their hæmostatic properties. Capillary oozing is abolished, and this is on occasion a great advance, but bleeding remains free from any but the smallest vessels unless a layer of tissue is coagulated of undesirable thickness. Nevertheless, HARVEY CUSHING has demonstrated how otherwise irremovable tumours of the brain and its meninges can be eradicated by means of high-frequency cauterisation. Patients faced with a terrible risk from blood loss have been carried safely through cranial operations which must in many cases have proved fatal if such measures had not been available. In other branches of surgery G. A. WYETH has shown [3] how malignant tumours can be eradicated by the arc in place of the knife. He also devised a method of permanently sealing vessels, temporarily controlled by Spencer Wells forceps, by sparking the high-frequency current through them before removal. This attractive method of operating upon carcinoma of the breast, for example, has not been very widely adopted in England, partly because healing does not seem invariably to be satisfactory afterwards and partly because surgeons have found the method of hæmostasis by sparking to be not very trustworthy unless the arteries are very small. Moreover, the alleged great advantage of the diathermy knife, that it prevents malignant dissemination during dissection, is not such a cogent argument as might be thought. In modern surgery local recurrences after well-performed mammary excisions are quite uncommon.

Nevertheless, the claims made for this new method of operating amount to a strong case for a long and thorough trial of the method. Some of the difficulties which have been met with may be due to the use of inefficient apparatus, or lack of knowledge and experience. Mr. ANDERSON, who has worked with this technique for 16 years, stated at the meeting of the Royal Society of Medicine that he had only just begun to employ the Cushing-Bovie machine which, working as it does on multiple tungsten gaps, permits of a more exact dehydration of tissue. This enables the surgeon to calculate how thick a layer of any particular tissue he is prepared to coagulate without sacrificing primary union after the operation. It would facilitate the further trial of the method in this country were it possible to obtain a machine equally selective but less expensive and more portable. Otherwise the prognostication of New England surgeons,[4] that in five years there will be few surgeons using the scalpel, is not likely to be realised.

STAPHYLOCOCCAL TOXINS.

TWENTY-FOUR years ago R. Kraus and E. Pribram showed that filtrates of *Staphylococcus aureus* might be so toxic that 2 c.cm. given intravenously to the rabbit would kill, while a specific antitoxin would give complete protection. In 1914 M. Nicolle and E. Cesari obtained practically

[1] Münch. med. Woch., 1929, ii., 1885.
[2] THE LANCET, 1930, i., 185.
[3] Internat. Jour. Med. Surg., September, 1930, p. 479.
[4] New England Journal of Medicine, 1929, ii., 1183.

the same results. L. E. Walbum later studied the toxin, and Julia T. Parker, in 1924, made filtrates which, though not sufficiently potent to kill rabbits, gave an intradermal reaction completely neutralisable by antitoxin. Following this investigation, Greenbaum and Harkins [1] and also Weise [2] have used filtrates in the prevention and treatment of furunculosis and other conditions, and are favourably impressed by their results. Interest in the staphylococcus was sharply aroused when the Australian Royal Commission in 1928 reported that the deaths of 12 children within 24 hours of inoculation with diphtheria toxin-antitoxin prophylactic were due to the staphylococci present in the contaminated prophylactic. This decision, it was stated, "came as a surprise to bacteriologists and clinicians." Burnet and Kellaway [3 4] in Melbourne have patiently worked for two years at the problem presented, and their work has now gone far enough to enable them to furnish a reasonable explanation of the events at Bundaberg. In a series of exhaustive papers these authors, though modestly disclaiming any new discovery, have reviewed the older work, repeated and extended it, and put our knowledge of the staphylococcus on a new plane.

Staphylococcus aureus, they find, produces a leucocidin which attacks the leucocytes, a nephrotoxin causing necrotic lesions in the kidney, a hæmolysin, and a toxin which causes an intradermal reaction resembling that obtained in the Dick test. Fortunately all these effects seem to be due to one toxin, for all are neutralised by one antitoxin. Two ingenious new points in the research were the identification of one particular staphylococcus by its susceptibility to a bacteriophage specific for the strain, and, secondly, the inclusion, amongst the criteria of a true bacterial toxin, of ability to form an antigenic non-poisonous toxoid when acted on by formalin. This property was first demonstrated for tetanus toxin by E. Loewenstein in 1914, by Glenny [5] for diphtheria toxin ("toxoid"), and later by G. Ramon ("anatoxine"). It has now been shown to hold for most, if not all, true bacterial exotoxins. Burnet found that *S. aureus*, for optimal toxin production, needs 10 to 20 per cent. of carbon dioxide in the atmosphere, but most strains produce in culture a white variant resembling *S. albus*, which has an enhanced ability to produce toxin without any addition of carbon dioxide, probably because it is permeable to other acids and so can maintain the proper degree of intracellular acidity. He suggests that a similar transformation in the individual organisms may occur when *Brucella abortus*, meningococci, gonococci—and, we may add, the acne bacillus—gradually change in subculture and become more readily cultivable. The necrosis present in a staphylococcal lesion may provide a local focus in which the oxygen tension is lowered. Fildes [6] pointed out in his work on tetanus that in injured tissue a local "anaerobic" condition may be produced, favourable to the production of toxin by the tetanus bacillus. Similarly the local increased tension of carbon dioxide may enable the *Staphylococcus pyogenes aureus* to produce its toxin and thus furnish an explanation of the malaise which may accompany even mild staphylococcic infections.

What promise is there of agents of therapeutic value from this work? It is an interesting line of thought that, had the physicians at Bundaberg in their possession an efficient antitoxin when the first child was reported ill, vigorous intravenous administration might have saved the victims. Such instances of intense staphylococcic toxæmia are, however, rare. Some of Burnet's rabbits given toxin and serum were protected against immediate death but died later. Perhaps the staphylococcus has, like the streptococcus, the two modes of attack demonstrated by Parish and Okell,[7] an acute assault by toxin and a later septic or pyogenic attack. The antitoxin made by Burnet protects against the former, but it may be that the efforts of serologists to make a serum, effective against the later pyogenic attack, will be as fruitless as in the case of the streptococcus. But we may reasonably expect results of value in diagnosis, prevention, or treatment from this rich scientific harvest of Kellaway and Burnet.

[1] Greenbaum, S. S., and Harkins, M.: Jour. Amer. Med. Assoc., 1930, xcv., 815.
[2] Weise, E. C.: Ibid., p. 324.
[3] Burnet, F. M.: Jour. Path. and Bact., 1929, xxxii., 717; 1930, xxxiii., 1.
[4] Burnet, F. M., and Kellaway, C. H.: Med. Jour. Austral., August 30th, 1930, p. 295.
[5] Glenny, A. T., and Sudmersen, H. J.: Jour. Hyg., 1921, xx., 176.
[6] Fildes, P.: Brit. Jour. Exp. Path., 1929, x., 151.
[7] Parish, H. J., and Okell, C. C.: THE LANCET, 1928, i., 746.

SPA TREATMENT FOR INSURED PERSONS.

THE British Spas Federation, comprising Bath, Buxton, Cheltenham, Leamington, Trefriw, Harrogate, Llandrindod Wells, Strathpeffer, and Woodhall Spa, have completed arrangements whereby members of approved societies throughout the country, suffering from rheumatic diseases and certain disabilities following injury, may undergo spa treatment at specially arranged terms. The scheme has been established for those who hitherto have been unable to bear the expense of spa treatment. Patients coming under its auspices will be regarded and treated, both in lodgings and at the baths, as if coming in a private capacity, and the whole therapeutic resources of each spa will be at the disposal of the physicians who prescribe for them. The inclusive cost will be as follows: medical service for three weeks (extended period pro rata per week), 21*s.*; baths, waters, and treatment, 18*s.* per week; medicine, pathological, and X ray examinations, 2*s.* per week; and board and accommodation, 35*s.* per week. As a result of a meeting between the Federation and the Friendly Societies' Conference, the latter has issued to each affiliated society instructions that spa treatment is available for the various members, and the scheme is ready to be put into operation.

WORCESTER INFIRMARY CONTRIBUTORY SCHEME.—During the first nine months of the present year the cost of treating members of the contributory scheme exceeded the income from it by £1136. The explanation given is that in many instances partial or total exemption from maintenance charges has had to be granted to patients who were formerly contributors but have dropped out of benefits.

ANNOTATIONS

THE DIGESTIBILITY OF FOODS.

THE term digestibility as applied to food has at least two distinct meanings. By clinicians it is commonly used to signify the ease with which the alimentary apparatus of an individual deals with ingested food, by physiologists to express the degree of absorption of the components of food from the alimentary canal. In dealing with patients with disordered functioning of the alimentary tract the choice of suitable foods is determined largely by considerations of digestibility in the first sense of the term. It is obviously very difficult to grade food satisfactorily in respect of this type of digestibility, for its assessment depends ultimately on the subjective sensations of individuals who react in different ways to the same food. Attempts have been made to dispense with subjective sensations and correlate digestibility with measurable quantities, such as the time taken for food to leave the stomach and the amount of gastric juice secreted in response to any given food. This method may have its uses but leads to curious results—the demonstration, for example, that sand is more digestible than roast beef. The measurement of digestibility in the physiologist's sense is a simpler matter, demanding merely a chemical examination of the food ingested and the material leaving the alimentary canal. Work has recently been published [1] on the utilisation of common foods which illustrates some of the differences which may exist between the digestibilities of certain foods when considered from the two standpoints. The experiments were carried out on dogs in which short-circuiting operations had been done, so that the residue of food which had passed through the small intestine could be collected without stagnating in the large bowel. Under these conditions the ratio of the weight of the residue collected to the total food consumed was found to be a reliable index of the amount of food absorbed. In such animals sour milk was better digested than sweet milk, and the addition of bread to milk decreased the amount of moist residue obtained with milk alone. Evaporated milk, unlike ordinary milk, did not decrease the amount of residue obtained from bread. Both cheese and meat were better digested when given in the form of lumps than when given finely comminuted. This curious fact is probably explained by the retention in the stomach for a longer period of the larger masses, which are thus better prepared for the final stages of digestion in the intestine. Soft-boiled and hard-boiled eggs were more completely absorbed than raw eggs. The latter passed too quickly through the intestine for much digestion to take place, yet the addition of raw egg to milk produced a mixture which was better digested than milk alone. Raw starch was very incompletely digested, but the mixture of raw egg and raw starch was dealt with quite satisfactorily. Lactose had a pronounced purgative action and any food given on the day following that of lactose administration was hurried more quickly than usual through the bowel and therefore less well absorbed. Dextrose and sucrose were very completely absorbed, as was rice. The most interesting feature of the experiments is the demonstration that one kind of food may influence the digestibility of another taken either at the same time as or subsequently to it. Some forms of food, which are usually considered to be distinctly indigestible in the clinical sense of the term, were dealt with more efficiently when taken in lumps than when minced or grated. In other words, the dog derives more benefit from its food when it is bolted than when it is throughly masticated. Obviously these results cannot all be applied to human beings as they stand. They suggest, however, that by judicious trial of combinations of foods more efficient nutrition may possibly be brought about in difficult cases than by the use of single foods which have the reputation of being in general easily digestible. They also emphasise the importance of building up the diet gradually in disorders associated with diarrhœa and gastro-intestinal disturbances generally.

[1] Childrey, J. H., Alvarez, W. C., and Mann, F. C.: Arch. Int. Med., 1930, xlvi., 361.

FURTHER OBSERVATIONS ON PSORIASIS.

A CONCEPTION, however original, of the ætiology of a disease, which cannot be disproved unless a specific organism is found to be the causal factor, is not, as a rule, a very satisfactory starting-point for research. Prof. Samberger, however, has given special study to psoriasis for many years, and his views command respect. They are based on a theory of predisposition of the individual, coupled with a specialised dyscrasia of cutaneous cell response. He records [1] an interesting observation that the psoriatic seldom or never produces a corn in response either to the stimulus of manual labour or the friction of an ill-fitting boot. The corneous layer of the epidermis does not, he presumes, hypertrophy in the normal fashion, and he adds to this surmise the observed clinical fact that psoriatics seldom or never suffer from boils, because exfoliation takes place before the staphylococcus invades the follicle, and the skin generally cannot respond to septic infections in the usual manner. In his view there is always a congenital, sometimes hereditary, weakness or dyscrasia of the keratin-forming cells, and this is the true cause of psoriasis. An individual with this type of skin can only react by producing the scaly patches. He argues further that this biological defect can be present in a greater or lesser degree, so that in some cases the smallest stimulus is sufficient to unmask the tendency, and the unfortunate patient is scarcely ever free from some psoriatic manifestation, while in others some quite extraneous factor, such as a coincident tuberculous or gouty diathesis or a defect in the hygienic environment—an absence of sunlight or fresh air—is the determining factor. In this way it is possible to explain the therapeutic effects of actinotherapy and the excellent results of sea-bathing on the Lido or the coasts of Northern Africa. The theory here presented receives some support from the histology of the lesions. Many observers have noted the presence of microbial abscesses in the parakeratosis—or corneous hypertrophy—that is characteristic and pathognomonic in the disease. No specific organism, and for the most part only staphylococci, has ever been stained or cultured from these minute dry purulent collections, and it is Samberger's contention that they are not primary but merely secondary manifestations of accidental infections of an inherently devitalised

[1] Further Observations on the Nature of Psoriasis. By Prof. F. Samberger, Prague Dermat. Woch., 1930, xc., 261.

epidermis. While it is difficult to cause a simple infection superficially, the deeper infections are common enough, and a well-known clinical type, although it is rare, is that termed psoriasis rupioides. The fact that psoriasis has certain favourite localisations, such as on the scalp and the knees and elbows, would seem at first sight to militate against the view of a congenital dyscrasia, but on the contrary it supports the contention. If there is a general devitalisation and "cutaneous cohesion defect" in these people, then it is just in the above-mentioned areas that we should expect to find its chief manifestations, for the scalp is a microbic reservoir, and the knees and elbows are always being exposed to friction. The numberless experiments designed to show the microbic origin of psoriasis, whether coccal or, as recently in America, by monilia, were always successful—but only in patients subject to the disease or with a history of it. It is quite likely, therefore, that psoriasis is always of bacterial origin, but that bacteria are only the accidental and associated, not the fundamental, cause. A consideration of these views explains much that is mysterious about psoriasis, and has, in addition, a practical therapeutic bearing. Samberger asks himself whether the dyscrasia must be regarded as purely cutaneous, or whether it may not be a secondary effect of endocrine deficiency or disturbance. The answer cannot be given until we possess more powerful and specific glandular products, for the results of the hormone treatment of psoriasis are notoriously uncertain at the present time. There is no specific remedy for psoriasis, and if Samberger's ideas are substantiated and accepted it is difficult to see what form these measures will take in the future. He himself thinks we shall have to grapple with the problem prophylactically, and possibly even while the anticipated case is still a fœtus in utero. Meanwhile, we can at times, at any rate, treat the associated or predisposing factors, such as have already been specified, and attempt to cure the patient of his gout or his tuberculosis by creating for him the best possible social and hygienic environment. We can also attempt to influence the general vitality and cohesion of the corneous layers by internal remedies, and for this purpose with all its disadvantages there is nothing better than arsenic. Unfortunately, no known preparation will effect this without causing toxæmic symptoms when it has to be administered for an indefinite period.

THE LISBON CONGRESS.

THE Thirteenth International Congress of Hydrology, Climatology, and Medical Geology took place in Lisbon, in conjunction with the annual meeting of the International Society of Medical Hydrology, from Oct. 15th to 23rd. H.E. the President of the Republic consented to act as *Président d'honneur*, and leading members of the Government took an active part in welcoming the Congress, the Prime Minister presiding at the opening ceremony. The President of the Congress was Prof. Egas Moniz, and the President of the International Society of Medical Hydrology was Dr. Belo Moraes, professor of clinical medicine in the University of Lisbon. There was a large attendance of members of both organisations, nearly every European country being represented. The programme included the titles of well over a hundred reports and communications.

The proceedings of the section of hydrology opened with reports from Prof. Maurice Villaret and Dr. Justin Besançon, of the Faculty of Medicine of Paris, and Dr. J. H. Cascão de Anciães, Prof. Mark Athias, and Dr. Heitor da Fonseca, of Lisbon. The reports were based on a series of most exhaustive experiments and investigations into the action of various mineral waters upon the unstriped muscle of the intestine, the gall-bladder, the bronchi, the ureter, the bladder. The results varied with the different mineral waters employed, and radio-activity appeared to be a factor of importance even when low in degree. The authors conclude that crenotherapy, or mineral water treatment, is one of the most efficient means of dealing with muscular spasm, but that the results vary according to the cause and mechanism of the spasms. They urge the establishment of laboratories in every spa for the investigation upon scientific lines of the effect of mineral waters in this as well as other directions.

At the second session of the section of hydrology, Prof. Dr. A. de Moraes Sarmento, of the University of Coimbra, presented a report upon the blood changes produced by mineral water treatment. He dealt with the uric acid cholesterone, and bile-pigments in the blood, the superficial tension and the viscosity of the blood-serum, the coefficient of sedimentation, and the leucocytes. Observations were made upon a large number of cases, and the author concludes that the alterations in the blood produced by the use of mineral waters constitute an element of high value in diagnosis, prognosis, and treatment. He appears to be unaware of the important work which has been done in England on these lines, but his results call for careful study. His report was followed by communications from many other recognised authorities, and included observations upon the treatment of syphilis at the spas, upon calcium metabolism, the treatment of some forms of arthritis, and many kindred aspects.

The third session opened with a report by Prof. Durand-Fardel, on L'assistance sociale en rapport avec les stations hydro-minérales et climatiques, which comprised, in addition to his own observations, a report of the work done in this direction in other countries as reported to the International Society of Medical Hydrology. Prof. Durand-Fardel's paper, with a report drawn up by Dr. Max Hirsch, of Berlin, also came under the consideration of the special committee of the International Society of Medical Hydrology, which is dealing with this question. Stress was laid in Prof. Durand-Fardel's report on the need to establish official teaching in all centres of medical instruction; the need for wider provision of facilities for the treatment of the poor in health resorts; and the provision of financial assistance through insurance companies, and by other means. Prof. Carneiro Pacheco, of Lisbon, followed with a paper on Aspects juridiques de l'hydrologie.

A joint session of the Congress with the Society of Medical Hydrology was held to discuss the treatment of digestive disorders by waters and baths. Prof. Armando Narciso opened, and was followed by Drs. Aine and Mazeran, with an important communication on the treatment of affections of the colon; Dr. F. Kraus, Dr. Michael Foster, and Dr. Zoltau Räusch dealt with disorders of the liver and bile-ducts; and Dr. Paul Weiss read a paper on the treatment of digestive disorders in childhood by mineral waters. Prof. Andrea Vinaj, who was unable to attend, sent a communication on the hydrotherapy of disorders of the stomach and duodenum.

In the section of climatology Drs. Georges Baudoin and Piéry presented an exhaustive analysis of the physical elements of climate and their physiological

and therapeutic effects. Prof. Cirilo Soares addressed the section on climatology and medicine, and many papers dealing with the climate of Portugal and its health resorts were presented. Prof. Lopo de Carvalho, of the Faculty of Medicine of Lisbon, dealt with influence of climatic changes in pulmonary tuberculosis. In the section of geology a number of papers were read dealing chiefly with the origin, character, and composition of various mineral springs. After the completion of the scientific business the Congress visited some of the more important spas of Portugal, including Estoril, Curia, Luso, Vidago, and Pedras Salgadas.

The International Society of Medical Hydrology received and discussed the reports of three sub-committees. That of the social hydrology committee was referred for further inquiry on the position in different countries, and the possibility of development. The report of the committee upon the protection of spas was approved, but referred for further work on indicated lines. The report of the international standard measurements committee was approved in principle and referred for modification of details.

SAFETY FIRST IN INDUSTRY.

In a paper read at a recent sessional meeting of the Royal Sanitary Institute, held at Nottingham, Dr. Leonard P. Lockhart remarked that in his opinion the safety-first movement in industry has not only failed to produce a diminution of industrial accidents, but has made a good many people too frightened of hurting themselves to carry on their job after even the most trivial mishap. The campaign advising people not to return to work too soon after influenza has over-reached itself, and there are many thousands of people taking weeks to recover when a few days would be adequate. They are certainly ill, but not with toxic post-influenzal depression. The depression is a mental process of fear that by going back to work they may relapse, and this in turn gives rise to purely subjective symptoms which it is next to impossible for a busy practitioner to sift to its ultimate depths. The same preoccupation with physical signs leads, he thinks, to honest but nevertheless quite wasteful and misguided employment of additional as well as ordinary insurance benefits. If there were no benefits people would struggle back to work, many would suffer for it, but the bulk would sustain no ill-effects. There would be difficulties and anxiety in many homes, but the nation as a whole would have a very much smaller sick absence list. Dr. Lockhart is careful to add that he is not in the least advocating the repeal of social insurance enactments, but he thinks the time has come to modify and remould our schemes lest by dire necessity worse should befall us. This argument leads him on to the contention that the very thing we have created to help our fellow-men has actually brought about a degeneration of that individual will-power by which alone man retains his personality.

"If a muscle is splinted it atrophies, if it is used to fight, to struggle, and to work it develops strength, provided that it is allowed to do so gradually and that the strain is not put on too suddenly or too soon. If from our birth the State protects our health, if we are fed too exclusively on pasteurised education and a sterilised mental pabulum then, sooner or later, disaster will befall us and find us weak and unresisting. There is no question of going back to the olden times of disease and famine, poverty and misery in order to obviate the dangers that now beset us, but rather should we use all our modern scientific and administrative machinery to educate people to stand on their own self-supporting legs and not to lean on an omnipresent, omniscient abstraction, called authority, to save us from the pitfalls that beset our lives."

The cure seems to Dr. Lockhart to lie in personal touch, and in effecting that touch early in the lives of young people. It is here, he thinks, more than in any other way that medical work within industry can achieve some of its best results, for by steady and persistent education much can be done to divert into more normal channels some of that excessive introspection which is a characteristic tendency of the present time. The private doctor knows the patient, but the factory doctor knows the work, and he knows, or should know, a good deal about the patient in relation to his working environment, so that the two between them can assess fitness for work in a way which neither of them can do alone, and as a result of this coöperation the task of adjusting the dysharmonics to reality can be greatly facilitated.

INVALIDITY AMONG TEACHERS.

In reviewing the work of the school medical service in London Dr. F. N. K. Menzies[1] deals with many matters which deserve more public notice than they have received; one of these is the breakdown of employees in the education service. The causes of death and retirement of teachers have been analysed by Dr. Letitia Fairfield, and some interesting facts elicited. A striking difference between the sexes is the fact that while the percentage of deaths among the men was greater in the proportion of 167 to 100, the retirements on medical grounds were more than twice as frequent in the women—1 in 194 being invalided out of the service yearly, as against 1 in 525 of the men. Dr. Fairfield ascribes the discrepancy to three main causes:—

1. That the man has family obligations and cannot afford to retire unless he must. This is not to suggest that women teachers take breakdown pensions unnecessarily, but rather that many men have to struggle on when their health would indicate retirement.

2. That women tend to age earlier than men. It is rather to a general failure of health than to a tendency to a physiological crisis in the later 'forties, that the difference in the total figures can be attributed. So far as breakdowns are concerned, the number rises steadily with every quinquennium after 40, and is highest between 55 and 60. A certain number of cases is directly attributable to the menopause, but in the majority, menopausal symptoms, if present, have probably no causal influence on the general state. The group classified as general debility, for example, showed a physical "break-up" usual in old age, but occurring in these women (who had in the main worked exceptionally hard) in middle life.

3. The fact that certain organic diseases or defects, interfering markedly with a teacher's career, are much more common in women than in men.

In a classified list of causes of retirement over the five-year period 1925-29 nervous diseases (including the headings organic, functional, and psychoses) figure largely with a total of 32 for men and 94 for women. Further light on this form of invalidity was thrown by Dr. Fairfield in her analysis of temporary absence for illness in a group of women teachers which appeared in the 1928 report. She found 171 cases of functional nervous disorder, which covered many long absences, some extending to 12 months, and showed this to be a very important factor in ill-health. Cases of actual overwork are rare, but the profession is inevitably strenuous and the personal circumstances of the teacher may have their difficulties. Both prevention and treatment are on a less satisfactory basis than is the case with

[1] Annual Report of the London County Council, 1929. Vol. III. Public Health, p. 141 et seq. London: P. S. King and Son. 2*s*. 6*d*.

purely physical disorders. Prevention opens up large questions which are not discussed in the report. Some of them are all too familiar. For example, to disallow women teachers from retaining their posts after marriage often means that marriage is impossible for them. Others are compelled by financial circumstances to go on working when they feel the strain is not good for them. While from the standpoint of the health of the woman teacher and of her own children (as well as for the benefit of the scholars) it would be an ideal scheme to retain teachers after marriage on a part-time basis; such a course would create administrative difficulties. Generally speaking, the continuing improvement of education is bound to affect the teacher. Smaller classes, better classification, and improvements in school hygiene will not only benefit the scholars, but must inevitably lighten the burden of those who instruct them.

AN EXAMPLE OF SAFE CHILDBIRTH.

LAST year a departmental committee, over which Sir Robert Bolam presided, named the essentials of a maternity service. Speaking on Monday last at a conference on maternal mortality (see p. 1000), the Minister of Health insisted on the coöperation needed if these essentials are to be realised, and, he added, "much education is still needed to persuade the mothers of the country of the importance of securing the skilled care to which they are entitled." There is in East London a good example of the safety that can be achieved by simple means if both kinds of coöperation are available. Thirty-five years ago a maternity home of seven beds was opened in Shadwell, and by successive extensions and removals this grew to be the East End Mothers' Lying-in Home, occupying eight adjacent houses in Commercial-road, with accommodation for 56 patients, now rechristened the East End Maternity Hospital. During the whole period nearly 51,500 confinements have been attended in or from the hospital with a maternal death-rate of 1·35 per thousand, but during the last five years that figure has been reduced and among 10,376 cases there was a death-rate of only 0·48 per thousand from puerperal causes or of 0·67 including incidental deaths. The visiting medical officer, Dr. W. H. F. Oxley, who communicated these figures to the Obstetric Section of the Royal Society of Medicine on Oct. 17th, pointed out that the hospital differs from most others in its routine work being done by midwives, the general practitioners on the staff being called in only when abnormality is present. The figures quoted give a fair picture of the results of the hospital's work for married women in the East End; the working classes are attended without selection on medical grounds, and few emergencies are admitted from outside sources, so that the patients may be regarded as a true sample of the child-bearing population of the district. Dr. Oxley gave some details of the routine work of the hospital. Occipito-posterior positions are regarded as serious abnormalities and are indeed the most frequent occasion for the application of forceps. Attempt at antenatal rotation has met with only a moderate degree of success. In breech presentations on the other hand antenatal version has been successful in about half the cases. Special care in delivery has largely eliminated the dangers from birth trauma and asphyxia in the remainder and Dr. Oxley suggests that in teaching hospitals breech presentations might be left uncorrected in order to give the pupils the necessary experience. The proportion of cases in whom labour was induced was 1·2 per cent; the forceps rate 2·9 per cent.; no craniotomies were performed and only one Cæsarean section. These figures suggest to Dr. Oxley that in other hospitals there is an unnecessary number of obstetric operations. Antepartum hæmorrhage is treated by the routine use of saline injections whose success is evident from the fact that 121 consecutive cases were treated without a maternal death. There were no deaths from eclampsia, from hæmorrhage (in booked cases), or from sepsis following normal labour. Of the five deaths two occurred outside the hospital, three from emergency in the hospital. A comparison of the maternal death-rate with that of the two metropolitan boroughs from which the bulk of the cases were drawn shows that the expected maternal death-rate has been reduced by three-quarters; the stillbirth and neonatal death-rate have also been reduced but not in the same proportion. Dr. Oxley attributes the success of the hospital's work to the sympathetic coöperation between the medical staff, the midwives and the patients along with a carefully thought-out organisation. These are potent factors. Dr. Oxley, we understand, makes a routine visit himself daily to the hospital, and no difficulty is experienced in getting expectant mothers to attend the antenatal clinic. His results induced the President of the Section, Sir Ewen Maclean, to remark that they might lead to some modification of the insistence on some of the current obstetric methods and equipment. Mr. L. G. Rivett who is on the consulting staff of the hospital expressed, for himself and others, the belief that continuity of method and tradition of work had much to do with the good record. In only one respect did the discussion reveal criticism of the methods practised. The Section was unanimous in regarding the treatment of local sepsis by curettage as a risky procedure. Speaking from an experience of 500 cases of local uterine infection in the Metropolitan Asylums Board fever hospitals Mr. J. M. Wyatt said that all had done well without intra-uterine manipulation other than injection of sterile glycerin.

THE NAME OF SYPHILIS.

THE term "syphilis," which has puzzled many inquirers, is derived from the writings of Hieronymus Fracastorius, whose history is well described by Dr. D. W. Montgomery, of San Francisco, in the *Annals of Medical History* for July. Born at Verona in 1482, ten years before Columbus discovered America, Fracastorius lived through the time of stress, poverty, and revolution in Italy. In the track of the armies which were constantly marching through the country, three terrifying diseases—plague, typhus, and the new venereal infection—added to the miseries of the people. Fracastorius wrote about all of them, but it was his poem on the third that has kept his name alive. It was the time of the classical revival, and he had taught himself to write Latin tastefully in the style of the best classical authors, so that his works were read with pleasure by the discriminating and the influential. He was besides a master of the science of the time, and when it was anxiously asked how came it that the terrible disease was unloosed upon the world just at this time, he gave the ready answer that in the Eastern hemisphere Mars was in opposition to Saturn and Jupiter, and their quarrel had unloosed this misery. Its origin in the West, long ago, was due to the indignation of the local sun-god, who had thus punished the world because

he had found the swineherd, Syphilis, sacrificing not to him but to the local king. The poem in which he told this story was handed round among the learned, and was at once approved, bringing its author fame and affluence. An appropriate name for the new disease was wanted, and "syphilis" drove its competitors out of use because (Dr. Montgomery thinks) its sibilance suggested the "viperous, venomous nature of its virus." The swineherd's name is fancifully derived from σύς and φίλος.

A SOCIETY OF PHYSIOTHERAPY.

A MEETING of medical men interested in the study and practice of physiotherapeutics was held at the rooms of the Medical Society of London on Oct. 24th, with Sir Leonard Hill, F.R.S., in the chair. After considerable discussion a resolution that a society of physiotherapy be formed and a further meeting held at a later date was carried unanimously. Medical men and women specialising in any of the different branches of physiotherapeutics who desire to be present at the next meeting (which will be held under Sir Leonard Hill's chairmanship on Friday, Nov. 14th) are invited to apply for invitation cards to the acting hon. secretary, Dr. R. King Brown, 17, Featherstone Buildings, London, W.C. 1.

INFANT FEEDING AND ENVIRONMENT.

MANY comparisons of breast-fed and bottle-fed infants have been made and the conclusions drawn from these almost always favour breast-feeding. Glazier[1] has studied the children attending baby clinics in two districts of Boston, one in the poorest part of the town and the other serving children living under much better economic, social, and hygienic conditions. He found that infants in the better district, however fed, gained more weight, had a lower incidence of infection and rickets, had a much lower mortality, and developed better than those from the poorer district. A striking observation was that half the babies from the poor clinic showed clinical signs of rickets when first seen. The bottle-fed infants in both districts gained less weight in the first six months and more in the second than the corresponding breast-fed babies; over the whole year the bottle-fed gained most weight. The difference in weight between the two classes was, however, much less than that between the two districts. Glazier attributes this largely to the high incidence of infection in the poorer clinic, owing to bad hygienic conditions and overcrowding. In the poorer district bottle-fed children were more liable to infection than those fed on the breast, although the reverse held true in the better locality. This is probably to be explained by lack of cleanliness and sterility in the preparation of the food. Another noteworthy fact was that the mortality of children attending the clinics was half that of non-clinic infants in the same district.

[1] Glazier, M. M.: New Eng. Jour. of Med., Sept. 25th, p. 626.

ROYAL NORTHERN HOSPITAL: POST-GRADUATE COURSE.—On Nov. 4th a course of free post-graduate lectures and demonstrations begins at the Royal Northern Hospital, Holloway-road, N.7. They will be on Tuesday afternoons at 3.15, and the subjects and speakers will be announced each week in our Medical Diary. From Dec. 1st–5th there will be an intensive course with one or more lectures each afternoon. Full particulars may be had from Dr. E. G. B. Calvert, Dean of the hospital.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt. E. V. Barnes to be Surg. Lt.-Comdr.
Surg. Sub-Lt. T. F. Tierney to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS.

ARMY RESERVE OF OFFICERS.

Lt.-Col. J. E. Powell, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

ARMY DENTAL CORPS.

Capt. C. H. Pywell to be Maj.

TERRITORIAL ARMY.

Maj. J. A. Stenhouse to be Lt.-Col. and to comd. the 149th (Northumbrian) Fd. Amb. vice Lt.-Col. R. Errington, vacated.
Capt. R. N. Craig resigns his commn.
Lt. C. R. C. Moon to be Capt.
R. J. Ormsby to be Lt.

ROYAL AIR FORCE.

Flight Lts. G. M. Anderson and G. O. Williams are granted permanent commissions.
The undermentioned Flying Officers are promoted to the rank of Flight Lts.: N. M. Jerram and G. O. Williams.

DENTAL BRANCH.

Flying Officer B. L. Harrington is promoted to the rank of Flight Lt.

INDIAN MEDICAL SERVICE.

The undermentioned officers retire: Maj.-Gens. A. Hooton and Sir T. H. Symons; Cols. H. Ainsworth, A. W. R. Cochrane, and M. MacKelvie; and Lt.-Col. R. Kelsall.

HONORARY PHYSICIANS TO THE KING.

The King has approved of the appointment of Col. G. L. Thornton (T.A.) and Lt.-Col. (temp. Col.) W. P. MacArthur, R.A.M.C., as Honorary Physicians to the King.

PARLIAMENT

NOTES ON CURRENT TOPICS.

THE NEW SESSION: KING'S SPEECH.

THE new session of Parliament was opened on Tuesday, Oct. 28th by His Majesty the King. In the gracious Speech from the Throne His Majesty said that he followed with grave concern and sympathy the continuance of heavy unemployment among so many of his people. The Government would persist in its efforts to develop and extend home, Imperial, and foreign trade, and to help in measures which would lead to greater efficiency in industry. Proposals would be laid before Parliament for the promotion of settlement and employment on the land, and of large-scale farming operations, and for the acquisition and improvement of agricultural land in need of reconditioning, and for the organisation of producers for marketing purposes. A Commission would be set up to inquire into the whole question of Unemployment Insurance, and in particular into the allegations of abuse of its provisions. The Commission would be asked to present interim reports on the most pressing questions and, if required, legislation based upon them would be introduced. In the meantime, a measure to make further financial provision for the Unemployment Fund would be laid before Parliament. Legislation would be introduced to secure for the community its share in the site value of land. Measures would also be submitted for raising the age of compulsory school attendance; for amending the law relating to trade disputes and trade unions; for setting up a Consumers' Council; for the modification and extension of the law relating to town planning and the preservation of rural amenities; for the amendment and consolidation of the Factory Acts; for electoral reform; for the ratification of the Washington Hours Convention and the International Convention for the Safety of Life at Sea; and for the establishment of a new statutory authority to deal with passenger traffic in London.

CLINICAL INTERPRETATION OF AIDS TO DIAGNOSIS

A Series of Special Articles, contributed by invitation.

LXXXVII.

ELECTRICAL REACTIONS IN DISEASES OF NERVOUS AND MUSCULAR SYSTEM.

THE remarks which follow are based on the ocular observation of several thousands of muscle and nerve reactions in the last ten years. The lesions studied include all types of upper and lower motor neurone lesions and myopathies, as well as a very large number of nerve injuries tested in the last years of the war and subsequently.

The foundation of all the electrical tests done on the human body was laid by the laboratory work on the muscle and nerve preparations of the frog. Important as this work has been, it is obvious that such tests cannot be done on the human body with the same amount of accuracy. Whereas the laboratory worker applies his electrodes to the naked nerve, the current in the hands of a worker in an electrical department has to pass through skin, superficial fascia, deep fascia, fat and muscle tissue, all of which act as barriers. To these barriers are sometimes added scar tissue, fibrous tissue, œdema, ischæmia, and hyperæsthesia, and in some cases a natural idiosyncrasy against or antipathy to electricity.

Some physicians and surgeons believe the electrical responses of muscle to be of little importance in nerve injuries. In my experience electrical reactions are a useful adjuvant in the diagnosis of a disease or nerve injury, or in the extent of a disease or nerve injury. Typical examples of cases in which they have proved useful are: (*a*) a gunshot wound of the lower third of the arm, with a small entrance and exit scar, sent down as a functional wrist-drop—as a result of an electrical test a complete organic paralysis was found; (*b*) weakness of finger and thumb extensors called functional, which by the nature of the electrical reactions was found to be a case of syringomyelia. Electrical reactions are, it is true, hardly ever diagnostic alone. In most cases sent down to an electrical department for testing, a diagnosis has already been made. But when, for example, infantile paralysis, progressive muscular atrophy, or disseminated sclerosis has been diagnosed, it is desirable to know the extent and degree of the complaint. In a child who has a complete drop-foot with no voluntary power, consequent upon anterior poliomyelitis, if a faradic response in extensor longus digitorum and peronei is obtained, it is possible to take a less gloomy view of the prognosis. Again, in upper motor neurone lesions, the spasticity of the muscles, combined with the history and other clinical signs, is sufficient for a diagnosis, without the electrical reactions. But they can elicit the facts that cases of hemiplegia are hyperexcitable to the faradic current or that those with paralysis agitans are hypoexcitable. In the myopathies I have found that the electrical reactions in early or doubtful cases are negative, and therefore not of much assistance, although a negative reaction will sometimes rule out a disease. But in old-standing cases clinical signs are obvious, and the muscle responses to electrical stimuli conform to those of the brain stimulus. For example, in myasthenia gravis there is a gradual fatigue of muscle to brain and nerve stimulus, and a similar fatigue when the nerve is stimulated by the faradic current. The electrical reactions are confirmatory and adjuvant. In one type of case—i.e., the patient with the subjective paralysis—the electrical reactions are the only real guide. The hysteric, in the hands of a skilled observer, some time or other will give himself away, but it is convenient to have at hand the faradic and galvanic currents, and by their use important mistakes in prognosis may sometimes be avoided. In a case under my own observation a complete functional paralysis of hand, arm, and upper arm followed a wound in the neck of a patient, a cornet player, who expressed great disappointment at the prospect of never playing his instrument again. In this case the will of the patient, a faradic battery and the persuasive powers of one doctor were able to reverse the opinion of a medical board of five; but the effect on the mind of a patient of being told by a group of doctors that he will not be able to use his limb again may be serious, for his conviction may prevent his complete recovery.

The Currents in Use.

The two chief currents which are used for testing in an electrical department are the faradic and galvanic. In addition to these the condenser method of Lewis Jones is useful and was employed by Dr. Worster-Drought in testing some 2000 cases of nerve injury from 1916–19. For the benefit of those who have forgotten the electrical reactions it may be desirable to set them out:—

1. *Healthy muscle*—brisk response to both currents.
2. *Upper motor neurone lesions*—hyperexcitability to both currents.
3. *Lower motor neurone lesions*—anything from a qualitative or quantitative response to the faradic current, and an altered response to the galvanic current, to no response to either current.
4. *The myopathies* or muscular dystrophies—
   - *Pseudohypertrophic muscular paralysis*—faradic and galvanic responses diminish quantitatively.
   - *Amyotonia congenita*—faradic and galvanic responses diminished quantitatively and excitability of muscle is diminished.
   - *Myotonia congenita*—well-known myotonic reactions following stimulus of faradic or galvanic current. Muscles relax very slowly.
   - *Myasthenia gravis*—two minutes of the faradic stimulus causes muscle fatigue, and the muscle will respond no longer. No change to the galvanic stimulus.

Nerve impulse is conducted by the axis-cylinder to the end-plates in muscle. Complete interruption can be obtained by section or disease of the nerve itself, or by destruction of the anterior horn cell, or by a lesion in the nucleus of a nerve, such as the seventh. Nerve responds to the duration of a faradic stimulus, but muscle will not, because it conducts slowly and requires a stimulus of prolonged duration. The study of the quickness of the excitability of nerve and muscle (now known as chronaxy) has been pursued in the laboratory with suitable apparatus by Lapicque, Adrian, Keith Lucas, and Bourgignon, and at one time it was hoped that the variation in results obtained under different conditions would have considerable practical significance in medicine. Although the work is of great theoretical interest, their methods are not employed in clinical diagnosis.

Reaction of Degeneration.—When a muscle has been cut off from its nerve-supply it will not respond to the faradic stimulus after the first 10–14 days. It will, however, respond to the galvanic stimulus, but in an altered manner. Instead of the contraction and relaxation being brisk, it will be prolonged, slow, or sluggish. This can easily be seen by the naked eye

of a constant observer, especially when compared with the stimulation of the muscles on the sound side. When the muscle exhibits these reactions—no faradic response but a slow galvanic one—the muscle is said to suffer from reaction of degeneration.

Absolute Degeneration.—When, however, some time elapses from the onset of the injury and atrophic ischæmic fibrosed muscles have to be tested it will be found that there is no response to the galvanic stimulus. The muscle should then be said to be suffering from absolute degeneration. This is a term recommended by Turrell, and I strongly advocate its use. It generally implies little hope of recovery. Every case must be taken on its merits, but in my experience any muscle in a case of, say, anterior poliomyelitis which shows this absolute degeneration after two years from the onset of the disease has not much hope of recovery, and physical treatment employed in the hope of restoring function to that muscle is wasted.

Next one must consider the case in which no faradic and only a slow galvanic response is present. I dislike the term "partial reaction of degeneration," and its meaning is not constant among electrotherapists. Admittedly a test with no faradic response and a slow galvanic one means that there is an action of degeneration present, but it is in my opinion a far more hopeful finding than an absolute reaction of degeneration. I prefer, therefore, not to use the word "partial" but to state the reactions and give an explanation. In a large number of cases, faradic responses and slow galvanic ones are present in a group of, say, three muscles supplied by a larger nerve, but not in the rest. For example, with the external popliteal nerve, tibialis anticus, extensor longus digitorum, and extensor hallicus may respond to faradism, and the rest of the muscles supplied by that nerve may not. All, however, would have slow galvanic responses. Such a case, I suggest, requires some further explanation. It is surprising how, in straightforward nerve sutures, nerve regeneration, voluntary power, and faradic response follows a course. A nerve regenerates in from 6–9–12 months, according to the position of the injury. Knowing this, it is possible to say that incomplete recovery after these periods is indicative of some obstruction, generally fibrous constriction.

James Sherren has said, "If the muscles under examination react to the interrupted current, no further investigation is necessary." Experience has shown that this certainly is not the case. It is possible to watch the recovery of a patient if, when the faradic response returns, the strength of the current needed to produce that response is noted. For example, the number of layers used in the secondary induced current of a Smart Bristow coil may be recorded. Supposing the muscle being tested responds to eight layers, and in a month's time responds to six layers, and then to four layers. This means that not only are the tissues, circulation, and general condition of that muscle improving, thus offering less resistance to the current, but also that there are a larger number of axis-cylinders regenerating.

At the same time the quantitative response of the muscle to the faradic stimulus improves. A nerve responds fully to a minimal brain stimulus; therefore, if a sufficient number of axis-cylinders have regenerated, voluntary power should return. The condition of each nerve injury and its position must be taken into account when giving a prognosis. A comparison may be made between two cases, in each of which there is no return to faradic response after one year: (1) a sciatic injury at the notch, and (2) a Bell's injury. In the first case there is yet hope; the second is hopeless.

The Condenser Set with Fixed Voltage.

Worster-Drought, using a condenser set where the voltage is fixed, and the duration of each impulse known, showed that certain muscles normally responded to certain stops on the condenser. There are 12 stops. No. 1 = 0·016 microfarads at 100 volts, and No. 12 stop = 4·0 microfarads at 100 volts. He demonstrated that, if in lesions of the majority of nerves, the majority of muscles react on No. 7 stop (= 0·25 microfarads) an incomplete lesion may be diagnosed, and operation is not advised. If in muscles normally reacting on No. 1 or No. 2 stops no response is obtained below No. 8 (most of the muscles supplied by the damaged nerve react between Nos. 8 and 10) then the case is re-examined after six weeks, and if there is no improvement in the condenser reaction, immediate operation is advised. This method has the advantage, perhaps, in advising surgical interference at an earlier date than is suggested when the faradic and galvanic current method of testing is employed. But the condenser method has this disadvantage, that sometimes muscles which would not contract to any stop would do so to the galvanic current.

Change in Galvanic Response.

In addition to the response of muscle to the faradic current and the condenser discharge as guides to the condition of recovery of an injured nerve, there is the change in the galvanic response. Hand in hand with the return of the faradic response, the galvanic response becomes brisker and more natural, and the amount of current required to produce that response is less. In my opinion, in doubtful cases the condition of the galvanic response is by far the most important. That the response is sluggish, in cases of nerve injury or disease, cannot only be seen by the naked eye, but can also be proved by the myographic method of Larat. This is very convincing, and I had the opportunity of seeing several cases tested by Dr. Murray Levick and wish the practice were more generally adopted. It has also been observed that in cases where reaction of degeneration is present the anodal closing contraction is greater than the kathodal closing contraction, and though this is not constant it is yet a useful adjuvant.

A few illustrative cases will show the extreme usefulness of the galvanic response.

1. Mrs. A. Amputation of breast; arm kept to side. Patient persists that she is unable to abduct arm, and said to be "difficult." Arm moved under anæsthetic; no more power after. In fact deltoid weakness more marked. Presence of functional paralysis of deltoid suspected. Electrical test showed a weak faradic response and a very slow galvanic. Patient subsequently developed a wrist-drop and further signs of an injury to the plexus.

Two cases of winged scapula, following operation.

Child.—After operation for removal of glands of neck. Faradic response in serratus magnus, galvanic prolonged.

Adult.—Following an operation on the nose a swelling appeared at the level of the superior angle of the scapula. Faradic response present in serratus magnus and a slow galvanic.

These are a few cases out of many types, to show the importance of the galvanic response. The child could not malinger at its age, and the adults were relieved of the insinuation that they were hysterics.

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SPECIAL ARTICLES

THE TOXICITY OF VITAMIN D.

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In 1927 Rosenheim and Webster[1] showed that ergosterol, when irradiated with ultra-violet light, acquires powerful antirachitic properties. In the following year[2] they were able to prove that ergosterol is specifically the parent substance of the antirachitic vitamin D. Within a very short time irradiated ergosterol was established beyond question as the most effective agent in the prevention and cure of rickets.

Ergosterol can now be prepared from yeast on a commercial scale, and vitamin D can be produced in almost unlimited quantity and in concentrations many thousands of times stronger than those of the naturally occurring vitamin. To the biologist has come the opportunity of testing the physiological effects of vitamin D more conveniently and more certainly than was ever previously possible, and that these effects can be so profound as actually to excite pathological disturbances in the animal body has become evident. In 1927–28 Pfannenstiel[3] and Kreitmair and Moll[4] described a pathological condition caused in laboratory animals by giving large doses of vigantol (a preparation of irradiated ergosterol produced by Merck of Darmstadt). Some reports of toxic effects ensuing in children from overdoses of vitamin D have also appeared, and consequently misgivings have arisen in some minds about the expediency of allowing the uncontrolled use of irradiated ergosterol. A review of the work which has been published on the subject is on the whole reassuring, for it shows that there is a wide margin of safety between the therapeutic dose of vitamin D and the dose which may prove toxic. Nevertheless it also shows that the drug is a remarkably potent one, exerting its effects from exceedingly minute doses; daily doses of 0·0001 mg. of a standard preparation will cure rickets in the rat in 10 days, while daily doses of 1·0 mg. will kill a rat within three weeks. Clearly, therefore, in deciding suitable dosage for therapeutic purposes both care and knowledge must be exercised.

Pathological Effects in Animals.

Kreitmair and Moll described the pathological effects in mice, rats, guinea-pigs, rabbits, cats, and dogs of giving large doses of vigantol (equivalent to 0·2–10·0 mg. of ergosterol) per day. The animals lost weight rapidly and developed anorexia and diarrhœa; their coats became roughened, their breathing rapid and laboured, and they died at periods varying from six days to three months. Post mortem they showed massive deposits of calcium salts in the arteries, the kidneys, the heart, the walls of the alimentary canal, and other organs. They showed also a pronounced shrinkage and pallor of the spleen. Confirmatory results have been obtained by a host of other investigators, among whom Harris and Moore[5] succeeded in showing that the toxic effects are specifically attributable to the vitamin, so that the condition may justly be defined as "hypervitaminosis D."

The calcareous lesions have been described in detail by a number of workers, amongst whom are Hückel and Wenzel,[6] Varela, Collazo, Moreau and Rubino,[7] Hoyle,[8] and the present writer.[9] They may appear in the organs of the rat as early as eight days after the first administration of the drug. The earliest calcification usually develops in the kidneys, where precipitation of calcium salts forms casts in the tubules. Local destruction and calcification of the renal epithelium and the surrounding interstitial tissue commonly follows and a focal chronic interstitial nephritis results. In the arterial system the aorta and its larger branches are the first to be affected. Irregular focal calcification of the media occurs, producing a type of lesion which appears to be practically identical with the familiar Mönckeberg sclerosis of the peripheral arteries of man. The calcifying process spreads from the larger to the smaller arteries until almost all, including especially the renal vessels, are involved. The venous system is unaffected. In the spleen there is a striking diminution of pulp cells and a general condensing of the reticulum and connective tissue with shrinkage of the whole organ. Intense hæmosiderosis is a common feature. The lymphoid tissue of the Malpighian bodies is notably diminished, as may also be the lymphoid tissue of the body generally. Atrophy of the thymus has been repeatedly noted. Anæmia is common, and Frazer[10] has described a diminished lymphocyte count. Studying bone formation in the growing animal in hypervitaminosis, Collazo, Rubino and Varela,[11] and Schmidtmann[12] found a premature calcification of growing cartilage leading to a cessation of development. These authors, and also Schoenholz,[13] found that hypervitaminosis D in the pregnant mother led to inhibition of growth and skeletal deformities in the young. The mineral metabolism in hypervitaminosis D has been the subject of much research, and hypercalcæmia and hyperphosphatæmia have been found to be characteristic of the condition.

A number of workers, including Harris and Stewart,[14] Smith and Elvove,[15] Brown and Shohl,[16] Light, Miller, and Frey,[17] Hoyle and Buckland,[18] Watchorn[19] and Ashford[20] have carefully investigated the Ca. and P. metabolism. Although the results do not agree on all points certain conclusions may be drawn from them. There is, in the first place, a tendency to increased serum calcium and blood inorganic phosphorus. There is at the same time a very greatly increased excretion of calcium and phosphorus, especially by way of the kidneys, and this, occurring when the food consumption is diminishing, as is usual in hypervitaminosis D, involves a reduction in the Ca. and P. retention in the body. In view of this the extraordinary accumulation of calcium salts in the tissues is not easily explained. At first vitamin D was thought to influence the calcium metabolism by increasing the absorption of available calcium from the food, but Watchorn's recent work has shown that the percentage absorption of calcium actually tends to fall in hypervitaminosis D, except possibly in the early stages. Opinion now, therefore, tends to ascribe the hypercalcæmia and pathological calcification to a mobilisation of calcium from the bones, as was suggested by Hess, Weinstock, and Rivkin,[21] Light, Miller, and Frey, and others. Possibly, therefore, a substance which aids calcification of bone may also cause decalcification of it when operating in excessive amount. Collazo and his co-workers[11] were, however, unable

to find in the bones any evidence of osteoporosis or resorption running parallel with tissue calcification.

Herzenberg [22] and Watchorn have investigated the ability of animals to recover from the toxic effects of vitamin D after withdrawal of the drug; in Herzenberg's experiments after as much as a 50 per cent. loss of weight from the poisoning. Both find evidence of healing of lesions and of disappearance of the calcium encrustations, but Watchorn finds that restoration of the normal metabolic balance is slow, and that even after nine days there is still grave disturbance. Schiff [23] found no evidence of healing or resorption of calcium from vitamin D arterial lesions.

Dosage.

An unfortunate feature of the experimental work in the past is the great diversity of dosage which has been used and the varying conditions of experiment. The earlier workers computed their dosage gravimetrically in terms of ergosterol. Experience has shown that this method is inaccurate because the amount of vitamin D produced by irradiation of ergosterol varies and depends on technical points which are only now becoming clear. According to Bourdillon, Fischmann, Jenkins, and Webster [24] three substances are successively formed and destroyed in the process of irradiation. The first of these is vitamin D, the second and third—further products of irradiation—are inactive. These authors estimate that the maximum possible vitamin D in any preparation of ergosterol is about 55 per cent. Marshall and Knudson [25] estimate it at 35 per cent. Since, therefore, irradiation destroys as well as produces the vitamin, uniformity of production can only be obtained by a careful control of technique such as has not been observed in the past. Thus, the amount of ergosterol used is no indication of the amount of vitamin D included. The most useful information is given by experiments in which the substance is administered in quantities representing multiples of the antirachitic, or curative, dose in the rat—the rat unit of vitamin D. The antirachitic dose is estimated biologically by feeding young standard rats on a standard rachitogenetic diet for 3–4 weeks and then adding the vitamin in measured doses so as to find the smallest daily dose which will effect healing in ten days. Healing is estimated by calcification of the bones, and it may be detected by radiological examination or by the "line test." For the latter the animals are killed and the radii and ulnæ removed, split longitudinally, and stained with silver nitrate. Calcification is recognised by the formation of a dark line in the metaphysis of the bone.

Cartland, Speer, and Heyl [26] found doses 1000 times the antirachitic dose harmless. Light, Miller, and Frey [17] administered 10,000 times the curative unit daily for six months without causing ill-effects. Klein [27] produced harmful effects in rats by giving 20,000 to 100,000 times the curative dose daily for one month. Tavares [28] caused death (but no calcification of their organs) in mice in 12–14 days by giving 10,000 times the curative rat unit. Bills and Wirick,[29] after a very extensive research in over 1000 rats, with prolonged experiments extending over two and three generations, conclude that 100 times the curative dose daily is harmless, 1000 times is just perceptibly harmful if carried over long periods, while 4000 times is definitely injurious. These figures are not entirely comprehensive, since they do not take into account certain variable factors which may considerably modify the toxicity of vitamin D. Schmidtmann [30] and Rabl,[31] for instance, have shown that a high calcium diet favours the early production of lesions, and Herzenberg [22] has found that a calcium-free diet, while it does not prevent the formation of lesions, appreciably delays it. A series of experiments carried out in the pathological laboratory of the Welsh National School of Medicine,[32] using about 5000 times the curative dose daily, has shown that vitamin D is very much more toxic to rats fed on a synthetic vitamin-free diet of high calcium content than to rats fed on a normal mixed diet of bread and potatoes. Apparently, therefore, as Harris [33] has lately remarked, a high Ca. : low P. diet favours the production of toxic effects of vitamin D.

There is also a possibility that vitamin balance may exercise an influence on the toxicity. Hojer [34] in 1926, reported that large doses of cod-liver oil when given with a diet insufficient in vitamin B produced focal necrosis of cardiac muscle. Harris and Moore [35] reported a similar experience in that they found that a high marmite (vitamin B complex) diet gave an increased tolerance for a vitamin A and D concentrate in the form of cod-liver oil. Kreitmair and Moll,[4] in discussing Hojer's results, suggest that the vitamin D fraction of the cod-liver oil was the one concerned with the production of the cardiac lesions. This would imply that deficiency in other vitamins may contribute in some measure to the toxic effects of vitamin D, but as yet the evidence is not clear on this point. The age and state of the animal can affect the toxicity. Schmidtmann [12] found that young animals stand vigantol better than do older ones, and Collazo and his co-workers [36] found that rachitic animals are more tolerant of high dosage than are healthy ones. Schmidtmann [37] found the toxic effects greater in splenectomised animals, and Haendel and Malet [38] greater in the castrated animal. Again different species show different susceptibilities. The cat, for instance, is much less tolerant of high dosage than the rabbit. Thus, in estimating the toxicity of vitamin D for practical purposes a large number of factors must be taken into account.

Toxicity in Human Beings.

Harmful effects in ten tuberculous children receiving large doses of vigantol have been described by Bamberger.[39] They consisted of loss of weight, vomiting, loss of appetite, the appearance of hyaline casts, blood and albumin in the urine, and a high blood calcium and phosphorus. Gyorgy [40] and Hess and Lewis [41] have reported similar findings with preparations of irradiated ergosterol. Putscher [42] described the finding post mortem in a child which had received 6 drops daily of vigantol of calcification such as is seen in animal experiments. Bamberger and Spranger [43] described parenchymatous nephritis in a child dead from vigantol poisoning. There is evidence enough, therefore, that the therapeutic use of the drug may be carried to a point of danger.

Hess, Poncher, Dale, and Klein [44] have conducted an exhaustive investigation of the effects of viosterol in human infants. Viosterol is the name adopted by the Council of Pharmacy and Chemistry of the American Medical Association [45] for a preparation of irradiated ergosterol standardised in its antirachitic properties by comparison with a certain standard potent cod-liver oil. Viosterol in oil 100 D possesses 100 times the antirachitic potency of the standard cod-liver oil. It contains about 1333 curative rat units per gramme. The American Council of Pharmacy

have more recently recognised the desirability for a product of a higher potency than the above, and they have accordingly authorised * the marketing of a preparation of viosterol 250 D. Hess and his co-workers conclude that 10 drops daily of viosterol 100 D is the minimum prophylactic dose for infants. They found the optimum curative dose for rickets difficult to assess, for while 15 drops frequently produced healing, 20 drops failed to do so in some cases. Infants on 30 40, 50, and 60 drops daily invariably showed healing. They studied the effect of massive dosage in children, giving 21 to 52 times the prophylactic dose for long periods and 250 times overdosage for short periods and found no injury resulting. The infants on high doses showed abnormally high appetites and were no less lively than others receiving cod-liver oil. Clearly, therefore, there is a wide range of dosage available in vitamin D therapy without approaching the danger limits.

Standardisation.

In this country there has, until recently, been no officially recognised standardisation of the various preparations of irradiated ergosterol which are obtainable. The adjustment of the strength of the preparations issued has been at the discretion of the manufacturers, and the physician has had to depend mainly on the directions issued by the manufacturers in regulating his dosage. Thus the drug has frequently been administered without any precise scientific foreknowledge as to its relative efficiency. The American Council of Pharmacy and Chemistry standardisation of viosterol on the basis of cod-liver oil has been a very valuable measure. It has enabled the American pioneers in this work to determine dosage in terms of a standard which is permanent, and to publish their experiences in terms which are clear to all who are using viosterol. Hess and Lewis,[46] however, criticise the American method of standardisation and suggest that a preferable one is to compute the potency of irradiated ergosterol in terms of protective or curative rat units. Such a method has already been adopted in this country by the British Pharmaceutical Society, utilising the Coward Unit. Coward [47] adopted as a standard a certain preparation of irradiated ergosterol, 0·0001 mg. of which, in daily doses, brings about healing in standard rachitic rats in ten days. Recently the Medical Research Council Committee on Accessory Food Factors [48] have announced their intention of adopting the rat unit and of maintaining a similar standard preparation for general use in assaying preparations of vitamin D in this country. Their antirachitic unit will be defined as the antirachitic potency of a quantity of their preparation corresponding to 0·0001 mg. of the ergosterol used in its preparation. The general adoption of this rat unit as a standard is highly desirable. It will have the invaluable effect of placing all experimental work on a common basis, and enabling experimental and therapeutic work to be more easily and accurately correlated that has been possible in the past.

From what has been said above one cannot but conclude that vitamin D is a therapeutic agent which, in ignorance, may and indeed has been, used dangerously. There is in this country, therefore, a pressing need for the official standardisation of all preparations which are on the market and for an authoritative pronouncement on the proper dosage for therapeutic purposes.

* Report of Council of Pharmacy and Chemistry, Jour. Amer. Med. Assoc., 1929, xcv., 021.

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NEW TUNBRIDGE WELLS HOSPITAL.—It has been decided to rebuild this institution at Culverden, on the outskirts of the town, upon a site commanding wide and beautiful views. The existing building is officially stated to occupy "the worst possible site" for a hospital. There is so much traffic on three sides of it that the windows have to be closed for most of the day, and there is a sawmill immediately behind. Walls and ceilings are crumbling, and the chimney in the women's ward is cracked from top to bottom. There is so little storage room that supplies have to be bought from hand to mouth. Of the 86 beds at least 84 are always full. The new scheme, which provides for 180 beds and includes a nursing home, will cost £160,000, of which £70,000 has already been subscribed.

WOODSIDE NERVE HOSPITAL.

THE REFOUNDING OF ST. LUKE'S.

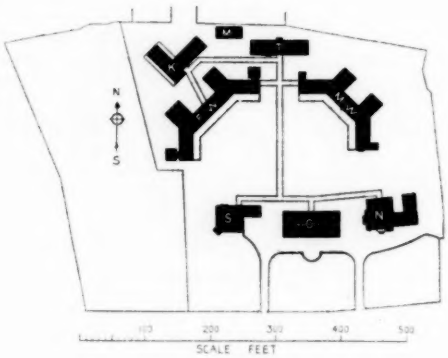
THE opening next Saturday, Nov. 8th, of the Woodside Nerve Hospital at Muswell Hill, N.10, by Princess Helena Victoria, is the outcome of an endeavour on the part of the Governors of St. Luke's Hospital to establish a modern institution, free from official control, for the treatment of those functional nervous and kindred disorders to which, by reason of the stresses of modern life, all classes of society appear to be increasingly subject. The need of a hospital devoted to the rational and scientific treatment of these disorders has been increasingly apparent to every medical practitioner. In order to meet the need, as far as was then possible, the Governors of St. Luke's Hospital established in 1923 two small wards in the neurological department of the Middlesex Hospital, where the results obtained justified the continuance of the experiment. The old St. Luke's Hospital was closed in 1916, when the site in Old-street was relinquished, and the new Hospital for Nerves at Muswell Hill is designed to bring the ancient charity into line with modern needs and methods, the latest forms of scientific treatment, including hydrotherapy and electrotherapy of all kinds, being provided. The hospital will be served by its own specially trained medical and nursing staff. Patients however may be visited and treated by their own medical advisers, should they so desire.

All capital expenditure in building and equipping the hospital has been borne by St. Luke's, whose resources however are unequal to maintaining it. Current expenses will be borne largely by the patients themselves according to their means. The standard fee has been based on the estimated average cost per patient taken over a full complement of beds, and has provisionally been fixed at 5½ guineas a week for those whose circumstances in life would appear to warrant it. Appropriate reductions will be granted at the discretion of the Committee of Governors, so far as the income of the hospital for the time being allows, to the less fortunate of the educated classes for whom it is primarily intended. Application for such reduction, strengthened by a note on the circumstances of the case from the patient's doctor, should be made by or on behalf of the prospective patient to the physician in-charge. In the case of well-to-do patients, fees in excess of the standard fee will be charged, the additional advantages secured being in the nature of private wards or sitting-rooms. The fee for an out-patient consultation at the hospital will not, except in very special circumstances, be less than half a guinea. The fees payable to practitioners who visit their patients to carry on their treatment in consultation with the physician-in-charge will be the subject of private arrangement between doctor and patient.

FIG. 1.

A bird's-eye view of the hospital grounds.

FIG. 2.



The lay-out of the buildings on the site.

The hospital stands in grounds of some 6¾ acres, occupying an elevated situation rising to the north at Muswell Hill, and overlooks Highgate Woods. It is easily accessible by train or omnibus from any part of the metropolis, the time taken in a journey from the centre of London being approximately half an hour. The main entrance is in Woodside-avenue. The grounds, as may be seen from the bird's-eye view (Fig. 1), comprise open lawns and flower gardens, a small bowling green, and a putting green. On the west is room for further expansion, and sufficient space is reserved for the occupation of patients who may be interested in gardening.

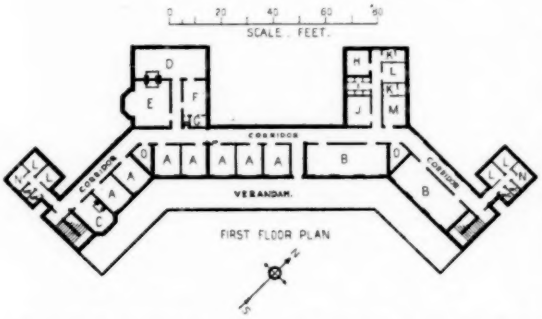
THE BUILDINGS.

The buildings, which all face south, are from the designs of Mr. T. A. Pole, F.R.I.B.A., and have been planned to interfere as little as possible with the woodland character of the site. The centre in the front is occupied by the administration block (Fig. 2. O), which is flanked by two houses; that on the east constituting the nurses' home (N), that on the west providing quarters for the matron, a physician, and the domestic staff (S). Behind these three buildings are disposed in a semi-circle

the two ward blocks (F W and M W), which together afford accommodation for 50 patients—30 women and 20 men. Behind the wards, and midway between them, stands the treatment block (T), while to the west of this are arranged the kitchens, stores, and boiler house (K). All the buildings are connected by covered ways, which afford protection to the staff and carry the service pipes.

Each ward-block (Fig. 3) consists of two floors, and is, except as to the number of beds provided therein, practically the counterpart of the other; and in the case of each block the two floors are identical. Each floor comprises bedrooms, dining-room, sitting-room, bathrooms, and examination room. The majority of the bedrooms are single rooms.

FIG. 3.



Plan of the women's wards (first floor plan). A, Single-bed wards. B, Four-bed wards. C, Private sitting-room. D, Dining-room. E, Sitting-room. F, Kitchen. G, Larder. H, Isolation room. I, Linen. J, Sist r's room. K, Lavatory. L, Bathroom. M, Examination room. N, Sluice room. O, Store.

Each bedroom is provided with wide folding doors opening directly on to a broad verandah, on to which the bed may conveniently be wheeled. Private sitting-room accommodation is provided. Hot and cold water is laid on to each bedroom, and the bathroom accommodation is ample, one of the baths being adapted for continuous treatment. Large recreation rooms for men, with a full-size billiard table, are provided in another part of the buildings. The furniture has been designed and selected with a view to providing, with as great an economy of space as possible, all that may reasonably be considered necessary or desirable for the comfort and convenience of the patients, the main object being to produce the atmosphere of a home rather than of a hospital.

The treatment block consists of two floors and contains rooms for hydrotherapy, colon lavage, massage, light treatment, electrical treatment and research. In this block also will be found, in addition to the three laboratories, the dispensary, dental surgery, X ray room, photographic dark room, and a room intended for occupation therapy.

The kitchen block, having a separate entrance at the back of the site in Grand-avenue, comprises on the ground floor the kitchen, pantries, staff room, store rooms, and linen rooms. Underneath it are situated the boilers which operate the low-pressure hot-water heating system and the domestic hot-water supply to all the buildings of the hospital. These are designed for the consumption of oil fuel, whereby smoke and dirt are avoided.

The out-patients' department, which it is hoped may usefully be developed in the future, is situated in the administration block, and consists of a waiting room and a consulting room, with which are associated two physical examination rooms.

THE STAFF.

The honorary visiting staff consists of:—
Neurologist: Dr. Douglas McAlpine.
Physician: Dr. Charles E. Lakin.
Surgeon: Mr. Eric Pearce Gould.
Gynæcologist: Mr. Comyns Berkeley.
Ophthalmic Surgeon: Mr. Maurice H. Whiting.
Surgeon for Ear, Throat and Nose: Mr. Somerville Hastings.

The physician-in-charge is Dr. R. Withers Gilmour, who has had the care of the wards at the Middlesex Hospital, and his deputy is Dr. Macpherson Lawrie.

Mr. R. J. Hallsall, L.D.S., is dental surgeon, and Dr. F. Gwynne Nicholas radiologist. The chairman of the Governors is Lord Blanesburgh, and three of the Governors are members of the medical profession—namely, Dr. Lakin, Dame Louise McIlroy, and Dr. Henry Yellowlees. The secretary is Mr. W. H. Baird, who may be addressed at 19, Nottingham-place, London, W.1.

LONDON MEDICAL EXHIBITION.

THIS exhibition was well attended until its closure on Friday, Oct. 24th, and the following notes upon some of its prominent aspects are in continuation of those published last week.

J. F. MACFARLAN AND CO. (32, Bethnal Green-road, E.) prominently show on their stall Anæsthetic Ether (Keith's), manufactured from duty-free alcohol, to which no methyl alcohol, pyridine, or wood naphtha has been added, while it is stated to be free from aldehydes, peroxides, acetone, and other impurities; Chloroform Pure B.P.; and Ethyl Chloride, a chemically pure product, put up in 3 and 5 c.cm. ampoules and in 30 and 50 c.cm. automatic tubes. For use as a preliminary to the induction of anæsthesia and of twilight sleep, as well as in obstetric cases, general attention was called to Opoidine, described as opium "made soluble, injectable, and dependable."—From a wide range of preparations shown by MAY AND BAKER, LTD. (Battersea, S.W.), there may be selected for mention: Arthrytin, ammonium ortho-iodoxy-benzoate, in capsules for oral administration, and in powder for intravenous and rectal injection in the treatment of arthritis and neuritis; Calcium Arthrytin, in tablet form, for oral administration in similar cases; Soneryl, butyl-ethyl-malonyl-urea, an hypnotic, analgesic, and sedative in tablet form; and Planocaine (ethocaine), a local anæsthetic suitable for subcutaneous, neural, and spinal anæsthesia, and less toxic than cocaine. A feature was also made of Metarseno-Argenticum, sodium silver metarsenobillon, a coördination product of silver and arsenic, soluble in water, and suitable for intramuscular and subcutaneous injection.—Among the preparations on the stand of ROBERTS AND CO. (76, New Bond-street, W.) attention was particularly asked for Robuval, which is described as an elixir of strontium bromide, with inodorous fluid extract of valerian. As a nerve sedative it is claimed to possess the virtues of valerian and bromide without any of their unpleasant features, while not being narcotic. A feature was also made of Inhalotab Benzoin Co., each tablet of which represents a teaspoonful of friars balsam, one-third of a grain of menthol, and 2½ minims each of melaleucol and oil of pine. The preparation is used for inhalation treatment in bronchial and laryngeal disorders.—The wheaten flour preparation of BENGER'S FOOD, LTD. (Manchester), is too well known to need mention. Other of their preparations may be brought to medical attention, such as Liquor Pancreaticus for partially digesting milk, gruel, and farinaceous foods; Liquor

Pepticus and other preparations of pepsin for aiding the digestion of proteins; peptonised beef and chicken jellies; and pancreatised lentil flour.

G. W. CARNRICK CO. (Vauxhall Bridge-road, S.W.) showed many endocrine products made in their own laboratories, thus securing fresh and healthy glands, and making analysis and standardisation certain. The firm call attention in particular to the success that has attended the use of oral tablets of Trypsogen in cases of diabetes, and has replied to the suggestion of doctors that the effects might be intensified if the tablets were protected from gastric digestion by coating them with Enterosol, which is physiologically inert and will dissolve in the intestine. WILCOX JOZEAU AND CO. (15, Great St. Andrew-street, W.C.) display a variety of Lacteol preparations emanating from Dr. Boucard, Rue Singer, Paris. The ferments are supplied in tablets and ampoules for intestinal intoxication, powders for ulcers, and suppositories for hæmorrhoids. There are also preparations designed for vaginal conditions and for insufflation.—BENGUE AND CO. (24, Fitzroy-street, W.) had a varied display on their stand, in which were included such tried preparations as Menatol, a menstrual tonic; Hemostyl, a highly activated serum to be administered by mouth or rectum in anæmia; Lipiodol, specially indicated for radiological work; and their Ethyl Chloride, in glass and metal tubes and ampoules of 3 and 5 c.cm., for local and general anæsthesia.—THE ANGLO-FRENCH DRUG CO., LTD. (238A, Gray's Inn-road, W.C.), had a comprehensive display of their well-known products: Stannoxyl, Mycolactine, Iodobesin, Orargol. Among their preparations of recent origin may be mentioned Acecoline, pure stabilised Acetylcholine Hydrochloride, recommended as a vasodilator in arterial hypertension; Bacte-Phages, the therapeutic bacteriophages of Prof. d'Herelle; Biocholine, ampoules of choline hydrochloride as used by Prof. Carles and Dr. Leuret in tuberculosis; Emge (Lumière), magnesium hyposulphite in tablets and ampoules, for the treatment of asthma, urticaria, migraine, and other allergic conditions; and Proliferase, a liquid preparation of living and viable yeast cells biologically adapted to proliferate at body temperature.—ARMOUR AND COMPANY, LTD. (St. Martin's-le-Grand, E.C.), had the original idea of displaying a large range of glands preserved in natural colours. To the efficacy of their Glanoid medicinal products, such as splenic extracts and ovarian solution, they are able to produce valuable professional testimony, while they called special notice to the Glanoid extract of liver in treatment of various anæmias, and the Glanoid whole pituitary preparation in dealing with the interesting condition, pituitary obesity.

On the stands of SAVORY AND MOORE, LTD. (143, New Bond-street, W.), associated with JOHN BELL AND CROYDEN (50–52, Wigmore-street, W.), there were prominent, among many pharmaceutical products of these well-known firms, tins of Soluga, a popular nerve food of organic origin containing extracts of calf's liver and red bone-marrow, of thymus gland, and of the spinal cord with Bulgarian Yoghurt, and glucose.—The Bipalatinoids, Cerettes, Cocoids, and Tablets of OPPENHEIMER, SON, AND COMPANY (179, Queen Victoria-street, E.C.), show great ingenuity in devising convenient methods of medication. On the stand also were exhibited the Dimol preparations—pulverettes, powders for lavage, and syrup and ointment, the first three being designed to counteract intestinal infection and the last being recommended in various dermatitic conditions.—FASSETT AND JOHNSON, LTD. (86, Clerkenwell-road, E.C.), distribute many well-known pharmaceutical products which were on display, among them being tablets of Prof. Buergi's Phyllosan Tablets, California Syrup of Figs, and Angier's Emulsion, where the fine division of the fat particles has rendered the preparation popular among doctors.—SANDOZ CHEMICAL WORKS (5, Wigmore-street, W.) direct attention particularly to Femergin (ergotamine tartrate), the preparation and action of which was recently described in our columns by Prof. Arthur Stoll. Femergin is indicated wherever the action of ergot is used in uterine contractions, in so-called functional hæmorrhages of the uterus, menorrhagia, metrorrhagia, disturbances during puberty and the menopause, and in cases of myomatous hæmorrhages.—BRAND AND CO. (Mayfair Works, Vauxhall, S.W.) showed their well-known invalid foods, essences of beef and chicken, meat juice in which the product is so treated that the albumin is retained in an uncoagulated form, and calf's foot jelly, guaranteed to be genuine, and flavoured with lemon, orange, or wine. Other preparations shown were Ferrocarnis, a tonic food in which a pleasantly flavoured solution of iron is in organic combination with concentrated meat juice, and Peptamalt, a new product, which consists of a highly concentrated predigested liquid food prepared from beef and barley malt.—The chief attraction at the stall of MENLEY AND JAMES, Ltd. (64, Hatton Garden, E.C.), was the various Iodex preparations, iodine ointment by itself or in combination with other drugs for various uses. Iodex collapsible bougies for ano-rectal, aural, and nasal work, to reach the deepest orifices, may perhaps be specially mentioned. A display of Neuro-Phosphates (Eskay Brand), a palatable, stable, and easily assimilable form of the acid glycerophosphates, and of Pyridium (phenyl-azo-alpha-diamino-pyridine-hydrochloride), a urinary antiseptic indicated in coccal and *B. coli* infections, demanded particular attention. For Pyridium there is claimed freedom from toxic effects; it is prepared in the forms of powder, ointment, and solution.—MODERN PHARMACALS, LTD. (2, Calthorpe-street, W.C.), were showing Sulfarsenol, the original sulpharsenobenzene, in a wide range of doses from 0·005–0·96 g., which, apart from its value in spirochætal diseases, has been found useful in puerperal infections and erysipelas; Arseno-Solvent, a glucose-saline solvent for sulfarsenol, ensuring painless administration even in concentrated solution; and Biscam, ampoules of bismuth camphorate in ether-washed olive oil, for the treatment of syphilis and yaws, either alone or as an adjunct to arsenicals.—VITAMINS, LTD. (38, Danemere-street, S.W.), exhibited Bemax, a product prepared under medical supervision from the embryo of cereals, which is regularly tested for its vitamin content. This popular preparation is pleasant to the palate, is administered without difficulty, and its mineral adjuncts are of pharmacological value. It is indicated in constipation, depression, debility, and sleeplessness.—At the stand of the GLAXO LABORATORIES (56, Osnaburgh-street, N.W.) there were shown Sunshine Glaxo, a humanised and practically sterile milk food, with added Ostelin vitamin D; Glax-Ovo, a blend of milk, malt extract, chocolate, and Ostelin; and other familiar milk preparations. Particular attention was drawn to Ostelin, a physiologically standardised concentrate of vitamin D, which was shown in several forms. Other exhibits included a highly concentrated solution of vitamins A and D in vegetable oil, enclosed in capsules, Adexolin Capsules; a sterile suspension of colloidal calcium with Ostelin for subcutaneous injection; and a local application for staphylococcal infections of the skin, Staphylococcus Antivirus, which is prepared from a number of virulent strains isolated from purulent lesions.

COATES AND COOPER (41, Great Tower-street, E.C.) showed on one stand the products of the Battle Creek Food Co., and called especial attention to Lacto-Dextrin, employed for influencing intestinal flora, and Psyllium Seed, whose physical properties make of them a useful colonic stimulant. On another stand they displayed the products of the Dr. Joachim Wiernik and Co., of Berlin, among which may be noted Pacyl, a derivative of cholin; Presoiod, an isotonic iodine solution, and Paraphakin, a combination of endocrine glands. The last preparation is recommended by Prof. A. Siegrist, of Berne, in the treatment of senile cataract. The same firm act as

agents for the Bio-chemical Laboratories (Locarno, Switzerland), the producers of Disulphamin; and the Gomenol Laboratories (Paris), where Gomenol, a natural antiseptic oil, is manufactured by Prof. Bertrand, technical director of the Pasteur Institute.—H. W. BRAUN (16, Water-lane, Great Tower-street, E.C.) was showing as agents for N. V. Organon, of Holland, certain organic therapeutic preparations, of which the one they particularly desired to recommend was Ovarnon. This is a preparation of fresh ovaries indicated in deficiency of the ovarian secretion, that is to say, in the menopause or after ovariotomy, and its action has been much reported on in continental medical papers.—NESTLÉ AND ANGLO-SWISS CONDENSED MILK CO. (6–8, Eastcheap, E.C.) showed a series of illuminated transparencies, to remind visitors of the merits of Lactogen, a dried full-cream cow's milk; their milk-food in powdered form; and other of their popular productions.—COW AND GATE, LTD. (Guildford, Surrey). The milk-food and chocolate-milk of the firm were displayed on three stands. The milk powders have been recommended by many pædiatricians, and appreciated by those who conduct appropriate clinics; the new blend of chocolate-milk is specially designed for nursing mothers.—The DENVER CHEMICAL MANUFACTURING CO. (London, E.) exhibited their hydroscopic, antiseptic poultice, Antiphlogistine, which is in daily use by doctors in the treatment of inflammatory and congestive conditions, where continuous moist heat, osmosis, and surface stimulation are indicated.—KOLYNOS, INC. (Chenies-street, W.C.), showed their antiseptic and non-gritty dentifrice, Liquid Kolynos, which is used as a mouth wash, gargle or spray; a powder for cleaning artificial dentures; and a denture fixative, a new preparation, for holding artificial teeth firmly and comfortably in position.

The coffee product shown at the stall of BANTAM PRODUCTS, LTD. (9, Queen Victoria-street, E.C.), was favourably commented upon by us quite recently (THE LANCET, 1930, i., 1272). It is not a coffee essence, but the soluble portion of the coffee bean in granular powder form, which dissolves in hot or cold water without "grounds."—From NUJOL LABORATORIES (Albert-street, Camden Town, N.W.) the medical profession receives two adjuvants to treatment, Nujol and Mistol. Nujol is a standardised intestinal lubricant, and its popularity will be increased by the reduction in its price. Mistol is a combination of menthol, camphor, chlorbutol, and eucalyptol, with a mineral oil, and, used through an atomiser or with a dropper, has proved useful in nasal catarrh and hay-fever.—PETROLAGAR LABORATORIES, LTD. (Braydon-road, N.). The "Petrolagar" brand of paraffin emulsion is produced in three varieties, the Plain, the Alkaline, and Phenolphthalein. This mechanical emulsion of pure liquid paraffin and agar-agar is in constant request in the treatment of colitis, peptic ulcer, and constipation, particularly that accompanying pregnancy.—The two prominent features of the stall of PEARSON'S ANTISEPTIC CO., LTD. (61, Mark-lane, E.C.), were Iodine-Medol and Creolin (Hycol). The first-named is a non-toxic and non-irritant antiseptic ointment, containing iodine 1 per cent. and Creolin 5 per cent., in a rapidly absorbed non-lardaceous base. It has been used for burns, chilblains, insect bites, and bacterial and parasitical skin affections, while it has also proved of value in psoriasis. An important claim for the preparation is that it can be applied to denuded surfaces without producing escharotic effects. Creolin, which is prepared from highly refined coal tar, and has a Rideal-Walker coefficient for *B. typhosus* 18–20, has a low toxicity, and has been used in oral sepsis, for gynæcological and genito-urinary irrigation, as well as instrument sterilisation.

On the stand of F. C. CALVERT AND CO. (Gibbon-street, Bradford, Manchester, and 5–6, Australian-avenue, London, E.C.), were carbolic preparations which are household words, their range including medical, toilet, and domestic preparations, disinfectants (fluid and powder), ointments, and dentifrices.—WRIGHT, LAYMAN AND UMNEY, LTD. (44–50, Southwark-street, S.E.), showed their coal tar soap and lysol, both of which well-known preparations are produced and manufactured in an up-to-date manner, and can be relied upon to fulfil what is claimed for them.—C. R. HARKER, STAGG AND MORGAN, LTD. (Emmott-street, London, E.), had on their stall a range of Petrolax preparations. Petrolax is an emulsion of liquid paraffin and agar-agar, which has been proved to keep indefinitely, and contains 65 per cent. of pure liquid paraffin of remarkably high viscosity.—SCHERING, LTD. (3, Lloyd's-avenue, E.C.), made prominent in a wide range of preparations Veramon, which has now been on the market for nearly a decade as a useful analgesic. In some cases it may replace or defer the use of morphine, while it has proved of use in dysmenorrhœa, and to give relief in many cases of post-operative pain. Medinal, a stable and non-cumulative hypnotic, the quick absorption and rapid elimination of which is implied by its solubility, also received prominence, as well as the well-known Atophan for rheumatic and gouty affections. The antiphlogistic and analgesic qualities of this drug also render it of value in forms of neuritis.—At the stall of CHARLES ZIMMERMANN AND CO. (CHEMICALS), LTD. (9–10, St. Mary-at-Hill, E.C.), attention was called to Asthmolysin (Weiss), a suprarenal pituitary compound, standardised, and indicated in the treatment of acute and chronic bronchial asthma for hypodermic use. Lobelin ("Ingelheim"), a sterile solution of the hydrochloride salt of the alkaloid Alpha-Lobelin, was also shown; this exerts a specific action in difficult breathing and respiratory paralysis.—H. R. NAPP, LTD. (3 and 4, Clements Inn, W.C. 2), exhibited a large number of medical preparations: Normacol, a substance of vegetable character stated to contain no paraffin, agar-agar, or psyllium seeds, but to induce peristalsis by supplying emollient bulk in the bowel; Anzypan, a product containing all the digestive enzymes put up in the form of a double tablet, and so constructed that the gastric ferments are released in the stomach, and the pancreatic enzymes and gall are disintegrated in the bowel; and Somnosal, described as a sedative-analgesic-soporific free from barbiturates and opiates, and harmless if taken over extended periods.—The exhibit of EVANS, SONS, LESCHER AND WEBB, LTD. (56, Hanover-street, Liverpool; 50, Bartholomew-close, London, E.C.; and Evans Biological Institute, Runcorn), demonstrated the wide field of pharmaceutical and biological products manufactured by the firm. The most recent addition to their medical specialties is Collozin, a colloidal zinc hydroxide, the nature of the preparation enabling the active constituent to come into close contact with the skin, while leaving no visible deposit. This drug is indicated as a lotion in eczema, urticaria, as a sunburn lotion, and as a protective on exposure to the wind.

(To be continued.)

A MEDICAL OFFICERS' HOSTEL.—Additions to the out-patients' department and a new resident medical officers' hostel in connexion with Bristol Royal Infirmary were opened recently. The hostel, with its furniture, has cost £10,500. Besides a dining-room and a lounge it contains four sitting-rooms and 23 bedrooms.

POSITION OF HEREFORDSHIRE GENERAL HOSPITAL. The board of management of this institution state that two of the wards are so insanitary as to be dangerous to nurses and patients. In the course of the last two years the buildings have been extended at a cost of £34,000, most of which has been provided. The working of the last six years has resulted in a deficit of £24,492, notwithstanding that, thanks to the contributory scheme, the income in 1929 increased by £1844. The expenditure, however, increased by £6434. It has been decided to raise a fund for the building of isolation and pathological blocks and, if possible, a new surgical wing which would have the effect of supplanting the two condemned wings.

PUBLIC HEALTH SERVICES

NOTE ON THE OUTBREAK OF SMALL-POX IN MERSEYSIDE.

By W. Hanna, M.D., D.P.H.,
DEPUTY MEDICAL OFFICER OF HEALTH, CITY AND PORT OF LIVERPOOL.

DURING recent years small-pox has shown a tendency to increase in prevalence in England and Wales as may be seen from the quarterly returns of the Registrar-General.

TABLE I.

Year.	Cases.	Deaths.	Year.	Cases.	Deaths.
1924	3,792	13	1927	14,769	49
1925	5,365	9	1928	12,433	53
1926	10,205	19	1929	10,975	39

The slight decrease in 1928 and 1929 has not been maintained during the present year, the figures for the first nine months of which have already reached the total for 1929. This increase has been due to a recrudescence in the London area, for small-pox in the north of England (Tyneside and Durham) has declined. In the north-west, outbreaks have recently occurred at Ellesmere Port 140 cases (Feb., 1928–June, 1929) and Skelmersdale, 38 cases (Nov., 1929–April, 1930). Since that time small-pox has been absent from this area in epidemic form.

Small-pox has shown a good deal of variation in severity; the mild type which has in recent years appeared in various district, has been, in fact, so mild that many believe it to be a fixed variant from the true or normal small-pox. The outbreaks in Ellesmere Port and Skelmersdale were of this non-virulent type. Case after case, either vaccinated or unvaccinated, was of an extremely mild character. The majority of the patients were unvaccinated and those vaccinated in infancy only showed evidences of disease after the usual immunity had disappeared.

In the more recent epidemics of small-pox the lower fatality-rate is evident (Table II.), the deaths occurring at each age-period showing marked differences, depending on whether the patients were vaccinated or not. From Government returns for the years 1923–26, out of 21,000 cases of small-pox

TABLE III.—SMALL-POX CASES ON MERSEYSIDE.

Case.	County borough.	Date of admission to hospital in 1930.	Age.	Vaccination and re-vaccination.	Infected by—	Onset and character of disease.	Type.	Result.	Remarks.
A.	Wallasey.	—	60	Infancy, two small and very faint; revacc. at 29 years, three good marks.	Unknown source.	Ill June 29th. Rash July 3rd. Supposed "influenza." Papules, head, wrists, and other parts.	Mild discrete.	Recovery.	Mild and unrecognised case. Vaccination history shows that patient was revaccinated at age 29 before going to S. Africa; 30 years afterwards he developed this mild attack of virulent small-pox.
B.	,,	July 17th	57	Infancy, four (⅛ sq. in.).	A. (wife of A.).	Onset July 12th. Vomiting and malaise. Rash 15th. Profuse but scattered.	Moderate discrete.	Recovery.	—
C.	,,	July 19th	33	Infancy, one (⅛ sq. in.) faint.	A. (patient stayed at A.'s house from May till July 7th).	Onset July 15th. Flushed, high temp. Rash 18th. Papular rash and purpuric spots.	Toxic and hæmorrhagic.	Death July 23rd, 1930.	Rash was slow in developing; cyanosis developed; marked injection of conjunctiva, subcutaneous hæmorrhages, and toxic condition. Toxic and severe case. Death three days from appearance of rash.
D.	Liverpool.	July 24th	57	Infancy, one (¼ sq. in.), one (⅛ sq. in.).	A. (visitor to house).	Onset July 19th. Headache and shivery. Rash 23rd. A fair eruption.	Mild discrete.	Recovery.	Patient visited A.'s house on July 5th. Eruption first appeared on face.
E.	Birkenhead.	Sept. 3rd	50	Infancy, two (⅛ sq. in.).	Unknown source.	Onset Aug. 27th. Rash 30th. Well-marked rash on face, body, and extremities.	Moderate.	Recovery.	Patient was not at work from onset. He infected two persons in own house and neighbour before illness was discovered by report of medical attendant.
F.	,,	Sept. 14th	33	Infancy, two (⅛ sq. in.). Revacc. Sept. 3rd.	E. (wife of E.).	Onset Sept. 9th. Headache and backache. Rash 13th. Well-marked large papules.	Moderate.	Recovery.	Concurrent small-pox and vaccinia.
G.	,,	Sept. 15th	22	Infancy, two (⅛ sq. in.). Revacc. Sept. 3rd.	E. (son).	—	Very mild discrete.	Recovery.	Concurrent small-pox and vaccinia.
H.	,,	Sept. 17th	20	Unvacc.	E. (next door neighbour).	Onset Sept. 13th. Rash 16th. Vomiting and headache. Eruption very marked and confluent over body. First appeared on face and wrists.	Very severe. Completely confluent.	Recovery.	Patient was on holiday, took ill and travelled home in train, rash coming out on Sept. 16th. He passed through a most severe attack, made a strenuous fight, and ultimately recovered.

in north and mid-England, the following information is of interest:—

TABLE II.

4038 Cases of Small-pox (Vaccinated)—

28 under 15 years	no deaths.
392 „ 15–30 years	1 death.
3618 over 30 years	3 deaths.*

* Two over 70 years.

17,718 Cases of Small-pox (Unvaccinated)—

10,709 under 15 years	17 deaths.
5,296 „ 15–30 years	1 death.
1,713 over 30 years	2 deaths.*

* One over 70 years.

At the present time there are two distinct and different types, one of a high degree of virulence and usually imported from the East and Africa; the other of extreme mildness which may have come to us from the United States where this type of disease has been present for many years. Even in the United States there have been from time to time outbreaks of the more severe form, presumably due to importation from outside of a more virulent strain. In the Detroit outbreak of 1924, for instance, there was a total of 795 cases and 105 deaths.

The Merseyside area has been free from small-pox in epidemic form for some considerable time, and it may be opportune to record the few cases of apparently virulent type which have recently developed in this area and have been treated at the New Ferry isolation hospital.

The first case was that of a cotton-sampler who fell ill about the beginning of July, 1930, but was not recognised to be suffering from small-pox; he is stated to have attended a doctor for influenza. This patient did not go to work after the first day of his illness, and for at least three weeks subsequently. The rash was scattered over body, hands, and face, and when seen, the remains of the staining were evident. This patient infected his wife and two other persons, one of whom died from hæmorrhagic and toxic small-pox. After an interval of about two months another group of four cases developed in the neighbouring borough with one very severe confluent case (unvaccinated) amongst them.

The present outbreak in Merseyside seems to be of the virulent type. The patient C. died three days from the appearance of the eruption. The vaccination area was faint and small, and as a result his vulnerability was high. The case was of the hæmorrhagic and toxic type. Case H. (unvaccinated) was of the confluent type, the whole body from head to foot being a mass of eruption, which after a few days pustulated; when secondary fever occurred the patient's life was in jeopardy, but fortunately careful nursing and treatment brought about his recovery. He was also of an age when the fatality is low. These two groups of cases of small-pox occurred within a short time of one another in the two adjacent and thickly populated areas, and seem to point to the fact that the later cases in Birkenhead were derived from those in Wallasey by the intermediary of some unrecognised case.

The methods adopted by the medical officers of health were as follows—viz., prompt vaccination and revaccination of contacts (who may not in many cases be easily ascertained), the supervision of these for the usual period, personal examination of contacts by the medical officer, together with house-to-house visitation. As in times past, these have had the effect of bringing the disease under control. The extensive maritime trade of this country renders it very liable to importations of the virulent form of small-pox and the necessary facilities for dealing with them should be in constant readiness. The risks of importation are increased by the rapid passage of vessels from port to port and the long incubation period of the disease. No system of port sanitary administration, however efficient, can prevent the possibility of such importations taking place.

HOSPITAL ACCOMMODATION FOR INFECTIOUS DISEASE.

THE Minister of Health has instructed county councils (other than London) to survey the hospital accommodation available in their counties for the treatment of infectious disease. In an accompanying memorandum it is stated that experience has shown that a large hospital serving a wide area forms a more satisfactory administrative unit than a number of smaller hospitals serving smaller areas, and with modern means of transport the removal of patients to a hospital situated at some distance from their homes presents little difficulty. It is suggested, therefore, that each county council should consider whether it would be desirable to close any small hospitals which are found not to be satisfactory, and to enlarge those hospitals which are satisfactory in all respects and can conveniently be extended and made to serve a wider area.

"It is particularly desirable," says the memorandum, "that, in the course of their survey, the county council should explore the possibility of further coöperation with the councils of county boroughs. In some cases it may be found that the additional accommodation required for some part of the county could most economically be provided by the enlargement of an existing hospital belonging to a county borough council, and it is, therefore, suggested that, where such conditions appear to exist, the county council should . . . consult with the council of the county borough as to the possibility of such an enlargement being undertaken and as to the terms on which the new accommodation could be made available for the inhabitants of the county."

When the survey has been completed, the county medical officer is to make a report to the council with a view to the preparation of a scheme. The report should review the existing accommodation and arrangements as disclosed in the survey, and make recommendations as to which hospitals should continue to be used with or without enlargement or alteration, what additional hospitals are required, and what (if any) alterations should be made in the areas served by existing hospitals. In this connexion the Minister calls attention to the growing need for the provision of hospital treatment for complicated cases of measles, influenza, pneumonia, whooping-cough, and the acute infectious diseases of the central nervous system.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED OCTOBER 18TH, 1930.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 125 (last week 44); scarlet fever, 2290; diphtheria, 1568; enteric fever, 50; pneumonia, 728; puerperal fever, 42; puerperal pyrexia, 123; cerebro-spinal fever, 11; acute poliomyelitis, 21; acute polio-encephalitis, 6; encephalitis lethargica, 8; continued fever, 1; dysentery, 16; ophthalmia neonatorum, 106. No case of cholera, plague or typhus fever was notified during the week.

The large number of small-pox cases reported this week more than counterbalance the small number of last week. Of the total of 125, 33 were reported from the county of London and the remainder from the following 9 counties: Durham, 3 (Jarrow); Essex, 42 (of these West Ham 23, Barking Town 13); Kent, 1 (Margate); Lancaster, 3; Leicester, 27 (C.B. 19, Blaby R.D. 7); Lincoln (Lindsey) 10 (Caistor R.D.); Middlesex, 1 (Hendon); Yorks (West Riding), 4; Monmouth, 1.

The number of cases in the Infectious Hospitals of the London County Council on Oct. 21st–22nd was as follows: Small-pox, 154 under treatment, 3 under observation (last week 140 and 4 respectively); scarlet fever, 1708; diphtheria, 2066; enteric fever, 23; measles, 95; whooping-cough, 112; puerperal fever, 17 (plus 5 babies); encephalitis lethargica, 121; "other diseases," 38. At St. Margaret's Hospital there were 12 babies (plus 2 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns including London there was no death from small-pox, 1 (0) from enteric fever, 6 (0) from measles, 2 (0) from scarlet

fever, 9 (0) from whooping-cough, 27 (4) from diphtheria, 85 (28) from diarrhœa and enteritis under two years, and 46 (5) from influenza. The figures in parentheses are those for London itself.

It is worthy of note that during the week in London no death was attributed to small-pox, enteric fever, measles, scarlet fever, or whooping-cough. One fatal case of small-pox omitted from the return for the week ended Oct. 11th was assigned to Hackney (Met. B.). The fatal case of enteric fever outside London occurred at Luton. Liverpool reported 2 deaths from measles. Birmingham and Liverpool each reported 3 fatal cases of diphtheria, Bootle and Salford each 2. Diarrhœa accounted for 10 deaths at Liverpool, 6 at Birmingham, 2 each at Croydon, Edmonton, Nottingham, Manchester, Preston, and Sunderland.

The number of stillbirths notified during the week was 245 (corresponding to a rate of 36 per 1000 births), including 46 in London.

DEATH FROM SMALL-POX.

The fatal case of small-pox referred to above was that of a woman, aged 59, who was removed to hospital on Sept. 26th. The disease was of the mild type. Death occurred on Oct. 3rd, the cause being certified as (1) (*a*) pneumonia, (*b*) small-pox. Dr. G. H. Dart tells us that a post-mortem examination was carried out, and it is doubtful whether there was not also a cerebral condition present as a secondary cause of death.

CORRESPONDENCE

LAXATIVES AND COLITIS.

To the Editor of THE LANCET.

SIR,—I regret that I have not seen until return from abroad Dr. Green's letter in your issue of Oct. 4th. In the meantime Dr. Graham-Stewart has replied to several of the points raised. I can assure Dr. Green that the use of liquid paraffin was not put forward in my remarks at Winnipeg as "the medical remedy of election in ordinary cases of constipation," and I shall have pleasure in sending him a copy of the paper in full when it is published. Diet, exercise, and the practice of a proper habit are of greater importance than the use of paraffin. Such measures with, and often without, the aid of paraffin, have, in my experience, led to regular actions in the great majority of constipated persons. They call for initial care and attention in their application to each person; it is also well to know what is the type of constipation and in which part of the bowel the delay lies.

It is, as Dr. Green implies, easier to prescribe one of the cascara group of drugs. But that course is not in the interest of the patient. For any aperient depending for its action upon irritation tends to do away with the need for a daily habit and effort, with normal exercise of the muscle of the bowel, and the skeletal muscles and nervous reflexes employed in defæcation. Paraffin makes the work of the bowel muscle a little easier. It is not an aperient to be taken in varying amount from day to day. When once the least daily amount needed has been determined, any increase or lessening should be tested for several days at a time, with no sudden change. Seepage can be prevented by simple measures, in the following order: (1) adjusting the dose; (2) taking paraffin (*a*) in warm milk night and morning; (*b*) with food (though it is generally better, as advised by Dr. Graham-Stewart, to take it apart from meals); (*c*) in the form of jelly; (*d*) as an emulsion with some non-digestible substance such as agar-agar.

With Dr. Green's second point, that there are persons whom paraffin does not suit, I am, of course, in agreement, though these become rare if care be taken to adjust the time and the dose. The thesis that "paraffin, being an indigestible, insoluble hydrocarbon, must cause a thin film covering the absorptive mucous surfaces of the intestine" and the "particles of food"—thereby interfering directly with the digestion of foodstuffs, raises points of interest which have been mentioned in the medical[1] and lay press of late and in advertisements of other laxatives. In man, when doses of paraffin from ½ to 1 oz. per day are given, the oil is, as a rule, not present as a separate film, but emulsified in the fæces. This we have found by routine microscopical examinations extending over many years. Excess of paraffin forms a casing or is passed separately after the motion. In experiments on white mice, by E. Schlagintweit, of Munich, it was found[2] that "sections from the stomach and all parts of the bowel showed the paraffin emulsified extremely finely throughout the whole fæcal mass." The softening action was ascribed to its power of holding water in the emulsified form, the stools containing 15 per cent. more water than usual. These findings were confirmed in mice by S. Loewe,[3] who showed also that with a larger dose a film of oil would appear over the fæcal mass. In the emulsified form—e.g., with agar-agar—double the amount would mix with the fæces without the formation of a casing of oil. The amounts given were comparable to human doses of one to two tablespoonfuls a day.

As regards the alleged adverse influence of paraffin upon nutrition, in the human clinical experiment of absorption tests, paraffin and all medicaments are, as a rule, purposely withheld. We have, however, two such three-day tests, made by my colleague, Mr. A. J. Leigh, B.Sc., in which liquid paraffin was present in the fæces. The results obtained were as follows:—

No. 2426, April, 1924. This patient was taking a tablespoonful of liquid paraffin twice a day, but missed some doses. The fæces contained 11 per cent. of paraffin.

	Per day.		Per day.
Food fat	85 g.	Food nitrogen	13·3 g.
Fæcal fat (true) ..	3·5 g.	Urine ,, ...	9·8 g.
		Fæcal ,, ...	1·2 g.

Food fat absorbed = 96 per cent.
N. balance + 2 g. per diem.

No. 2731, March, 1925. In this case the paraffin was given in the form of jelly, one teaspoonful four times a day. The fæces contained 17 per cent. of paraffin.

Food fat .. .. .. 61 g. per day.
Food nitrogen .. .. .. 11·7 g. ,, ,,
Food fat absorbed = 95 per cent.
N. balance + 3 g. per diem.

In these cases, therefore, absorption was not impaired. I can avouch also, from observation of large numbers of cases, that the ingestion of paraffin, in moderate doses, does not, on the one hand, prevent a steady increase of weight in cases of subnutrition; and, on the other hand, that it is useless as a method of reducing weight unless the patient is also being dieted. Like Dr. Green, I have not so far recognised a case of wasting as having been due to its action.

I am, Sir, yours faithfully,

EDMUND SPRIGGS.

Ruthin Castle, North Wales, Oct. 27th, 1930.

To the Editor of THE LANCET.

SIR,—I do not doubt that the régime described by Dr. Graham-Stewart would be effective in constipa-

[1] See Brit. Med. Jour., 1930, i., 478 and 567.

[2] THE LANCET, 1927, ii., 688.
[3] Klin. Wochenschr., 1929, viii., 1850.

tion. Nevertheless, this is no remedy for general practice. The average constipated patient requires something that is not only effective but simple. His ideal is to swallow his simple dose or tablet last thing at night or first thing in the morning, and the instruction to take paraffin plus adjuvants half an hour, or more, before meals would not appeal to him. He could not afford regularly to take expensive remedies. Dr. Graham-Stewart says that he has known only three or four patients unable to take paraffin. But between being absolutely unable to use a remedy and finding it undesirable there is a big gap which, when bridged, leads to a large number of patients with countless more or less reasonable objections. A patient may realise that he could, if he wished, put up with the disadvantages of paraffin, but would justifiably ask why he should when there are other remedies to be had that do not cause like trouble. The action of paraffin, I find, is very variable, sometimes producing too efficient evacuations, sometimes the reverse, and often disappointing completely. It is certainly not a drug to rely on for regular daily time for defæcation. It appears to stagnate in the stomach and sometimes in the cæcum, rendering the musculature reflexly atonic. At other times in the same individual it stimulates violent peristalsis, and may cause continuous intestinal unrest which is fatiguing to the nervous system. Perhaps this explains why Dr. Graham-Stewart regards it as possessing "no kick." The adjuvant he suggests to supply this deficiency has the disadvantage that in some individuals it causes griping and tenesmus. I should not be surprised to learn that it contains, in addition to the published constituents, a small quantity of aloes or similar purgative. I submit that if paraffin is used and an adjuvant is necessary the best drug is cascara. The use, when indicated, of belladonna and bromide, seems desirable. One other point. It is widely accepted nowadays that bulk and roughage in the diet are beneficial in constipation. This is not altogether in accordance with my clinical observations. The primary defect in constipation appears to be in the neuro-muscular mechanism controlling peristalsis in the stomach and small intestine and mass movements in the colon. I find that these movements are not necessarily stimulated by either a bulky or a rough residue. On the contrary, they appear sometimes to be adversely affected thereby. An efficient colon will work well with a small residue; an inefficient colon may be severely embarrassed by a larger or a more irritating residue.

I am, Sir, yours faithfully,

South Tottenham, N., Oct. 19th, 1930. L. J. GREEN.

To the Editor of THE LANCET.

SIR,—Whilst thoroughly agreeing with Dr. Graham-Stewart in the main part I notice that he makes no mention of the use of agar-agar to impart the necessary "kick" to liquid petrolatum. I have found an emulsion of these two, with the addition of phenolphthalein in small quantities for acute stasis, or a suitable alkali for cases of gastritis, dyspepsia, or colitis, as in the varieties of an emulsion of Petrolagar, to facilitate re-education in serious cases of bowel defect. I have seldom heard of a patient using such a preparation complain of seepage, and never of ineffectiveness or harmful result from its use.

I am, Sir, yours faithfully,

J. H. ADDISON, M.R.C.S. Eng.

Watford Way, Hendon, N.W., Oct. 28th, 1930.

A MEDICAL SERVICE FOR THE NATION.

To the Editor of THE LANCET.

SIR,—It is regrettable that sentimental considerations should be permitted to obscure the issue so ably presented by Dr. Geoffrey Evans. Dr. Evans has faced the situation in stating boldly that a large proportion of the nation are not economically worth individual medical attention. With each decade, as Dr. Joules points out, diagnosis and treatment become more costly; but also with each decade there is an increase in the number of economically worthless members of the State preserved to become a burden upon the rest of the community. It cannot be maintained, as Dr. Layton lays down, that at birth all are equal. The mentally defective is born with fewer neurones than the normal baby. The factors of heredity must influence very largely the potentialities for disease, irrespective of environment. There can be no doubt that there is taking place a relative increase of physically and mentally inferior people.

What is the attitude of the medical profession to be to this problem? Is it willing to burden itself with the task of individual service to this ever-increasing body? Does it really pretend that it can afford to give to these patients the same medical attention as to those patients who pay for services rendered? If the profession does undertake the work, will there be any time left over for research? The ideal of service will always be maintained in the profession, irrespective of remuneration, but it is, above all things, a personal ideal. Each man has his own code, his own ethic. It is impossible to impose a collective ideal on a body of men comprised of the most different types. An underpaid service, such as the extension of the panel system to dependants is bound to be, must mean the imposition of a compulsory philanthropy on a body of men who, however willing, are economically unable to maintain it.

The nation must be prepared to cut its losses in this direction as in others. We must realise that at present it is not a financial possibility to make the offer of the luxury of individual service to those members of the State of whom the majority absorb considerably more than they contribute.

I am, Sir, yours faithfully,

Bristol, Oct. 24th, 1930. FRANK BODMAN.

RECRUITMENT FOR NURSING.

To the Editor of THE LANCET.

SIR,—Dr. Carling's letter in your issue of Oct. 11th will, I hope, receive the attention it deserves. The present shortage of nurses and the future outlook in that direction must be seriously considered. The General Nursing Council are quite alive to the difficulties of the situation, but if these are to be surmounted expeditiously that body will need, and can rightly demand, the help of the medical profession. The more distinguished members of our profession, to whom we look for leadership, are not so much apathetic to the situation, but have as yet hardly realised it. The big teaching hospitals, where most of their work lies, can still command a supply of probationers, and have not yet felt the pinch.

Remuneration seems to be at the root of the problem. A nurse must serve an apprenticeship of a severity unparalleled in any other profession, involving tremendous personal sacrifices as well as the hardest physical work, and at the end of it, save for the lucky few, there is a mere pittance of a salary

as a reward. During this three years of hard nursing training an attempt is made to cram her unprepared and tired brain with a grade of anatomy, physiology, medicine, and surgery that the medical student with several years' special preparation finds it hard enough to assimilate. During a recent tour in Canada I found that a certificated nurse doing staff nurse duties commanded a salary of 80 to 90 dollars a month—more than twice as much as an English nurse can expect. Might one not suggest that a nurse who has passed her State registration examination should be able to expect some such reasonable salary as this? Those who could not, or did not wish to, reach that standard of efficiency should be content with smaller rewards. This would make nursing a reasonable profession for a woman to choose, and with this goal in view the candidate for State registration might be content with a longer period of training on more humane and less frenetic lines. At the end of which she would find herself properly qualified and not merely, as Miss Carter says in your issue of Oct. 25th, "overtired in body and mind, with insufficient knowledge to be the doctor's right hand."

Until we have a proper training and adequate salaries for nurses we shall never attract either the quantity or the quality of women that we so sorely need. I am, Sir, yours faithfully,

Frimley, Oct. 27th, 1930. R. C. WINGFIELD.

CANCER RESEARCH ON MAN AND ANIMALS.

To the Editor of THE LANCET.

SIR,—The possibility of transferring certain aspects of the cancer problem to animals was the dream of the early workers, who of necessity were physicians and surgeons. That it is now a specialised discipline is inevitable, like the separation of priest and doctor that preceded it. Those most deeply engaged in the problems of cancer may be permitted to attribute the slowness of practical results in part to the inherent difficulties of the subject, a point of view which troubles Mr. Hastings Gilford very little. That the impatience of those on the clinical side of cancer research is very real is evidenced by the repeated emergence of methods of treatment which do not withstand the test of time. Very few of these come from the laboratory investigator of cancer in animals—disproof is too rapid for them to gain headway.

The repercussion among laymen in favour of quack remedies and philosophical prophecy is intelligible, and on a little reflection these short cuts to finality and intellectual peace can be regarded with sympathy.

I am, Sir, yours faithfully,

Queen-square, W.C., Oct. 24th, 1930. J. A. MURRAY.

THE ALKALOIDS OF ERGOT.

To the Editor of THE LANCET.

SIR,—In a recent publication [1] we recorded that we had been unable to obtain ergotamine or ergotaminine from official ergot—i.e., ergot of rye—although ergotoxine and ergotinine were isolated without difficulty.

Prof. Stoll in the letter which he contributed to your issue of Oct. 18th attributes our inability to obtain ergotamine from official ergot to the use of faulty methods of extraction and isolation, but in view of the fact that we effected the isolation of ergotamine and ergotaminine from unofficial ergots, this explanation is inadequate. Prof. Stoll has given the same explanation elsewhere [2] in the case of previous workers who also obtained only ergotoxine and ergotinine from ergot of rye, and we naturally tested the efficiency of our technique.

We extracted ergot with ether and separated the alkaloids from the ether solution as usual. By dissolving any of the ergot alkaloids in the alkaloid-free ether solution and adding the ether solution to the exhausted ergot we reconstituted an ergot containing known amounts of alkaloid. By then applying Kraft's process [3] we were able to check the efficiency of the extraction. If we added ergotamine we could recover ergotamine practically without loss and without conversion to ergotaminine. The reported isolation by Forst [4] of ergotamine in addition to ergotoxine to which Prof. Stoll refers is not convincing, since Forst offered no satisfactory evidence for the identification of ergotamine. We repeated Forst's process when it appeared and obtained only ergotoxine and ergotinine.

In our original paper we state that "during the past few years we have examined many commercial specimens from Spain, Portugal, Russia, Poland, Scandinavia, Hungary, and Czecho-Slovakia, all of which gave ergotoxine and ergotinine and these alkaloids only." Nevertheless, in spite of this extensive examination, Prof. Stoll writes that "it is of course quite possible that Smith and Timmis did not have any official ergot rich in ergotamine at their disposal." If Prof. Stoll will indicate any commercial source of ergot of rye rich in ergotamine we shall be pleased to complete our examination by including ergot from such source.

At present we have no final explanation to offer of the differences between Prof. Stoll and ourselves, but two may be suggested. It is possible that rye may occasionally, or possibly regularly in some districts, be infected by a distinct species of *Claviceps* which gives rise to ergotamine, whereas the normal infection *Claviceps purpurea* gives rise to ergotoxine. The second suggestion is that, during a process of manufacture, ergotoxine may be converted to ergotamine. Chemical, pharmacological, and physical evidence show that the two alkaloids are closely related, and it is not improbable that such a conversion can be effected.

Since Spiro and Dale have shown that ergotoxine and ergotamine are pharmacologically identical, everything Dr. Stoll says about the clinical virtues of the one must apply with equal force to the other.

We are, Sir, yours faithfully,

SYDNEY SMITH,
G. M. TIMMIS.

Wellcome Chemical Works, Dartford, Oct. 25th, 1930.

[1] Journ. Chem. Soc., 1930, p. 1392.

[2] Die Naturwissenchaften, 1923, xxxiii., 705.
[3] Arch. Pharm., 1906, ccxliv., 336.
[4] Arch. Exp. Path. Pharm., 1926, cxiv., 132.

SUNDERLAND WAITING-LISTS.—There are 240 beds in Sunderland Royal Infirmary, and the waiting-list contains 723 names. To the children's hospital, with 68 beds, 151 children are awaiting admission. The infirmary has a debt to the bank of £12,700.

DURHAM CENTRAL PUBLIC ASSISTANCE HOSPITAL.—A conference of representatives of the Durham county council and the medical and surgical staffs of the voluntary hospitals has decided to establish a standing joint hospitals conference for the county, and has agreed in principle to the creation of a central public assistance hospital. It was officially stated, on behalf of the county council, that a careful survey of the poor-law hospitals transferred to the council showed that, with one possible exception, all are obsolete and incapable of being adapted to present-day requirements.

OBITUARY

WALDEMAR HAFFKINE, C.I.E.

THE death is announced of Prof. Haffkine, formerly bacteriologist to the Indian Government, which occurred at Lausanne on Oct. 26th, in the seventy-first year of his age.

Waldemar Mordecai Wolff Haffkine was born in 1860, in Odessa, and received his early classical education at the Berdiansk Gymnasium, proceeding thence to the University of Odessa, where he graduated in the Science Faculty in 1884. For the next four years he was attached to the zoological museum of his native town. Through the circumstances of parentage and residence, and through his great intellectual capacity, he was already an accomplished linguist when, in 1888, he became assistant to the professor of physiology in the University of Geneva. He discharged there professorial duties for the only time in his career. But his stay in the Swiss medical school was short, for one year later he was invited by Pasteur to be his assistant in Paris. Until 1893 he was engaged under Pasteur in bacteriological research, and by that date, when he was invited by the Government of India to devise methods for the arrest of cholera, he was already a marked man. In India his first work was conducted at the new Government Research Laboratory at Bombay, now known as the Haffkine Institute. Here he brought his arduous training and scientific imagination to bear almost at once upon the problems with which his name will ever be associated. In the laboratory of the Pasteur Institute he had worked out a scheme of preventive inoculation, and before proceeding to India he explained his theory with demonstrations of his technique in a series of lectures at Netley, and at the laboratories attached to the Examination Hall of the English Conjoint Board. At Netley he gave demonstrations of his method of inoculating with a modified cholera virus as a protective, the work having been done in Paris in collaboration with Prof. Roux. A detailed communication to the Royal Colleges, where the experiments were repeated by Sims Woodhead, then director of the laboratories, showed at once that in certain directions the method of treatment promised to be of great value. It was stated at the time that the cost of the investigations to be undertaken in India were being largely defrayed by private generosity.[1]

Shortly after arrival in India Haffkine made a pilgrimage with the object of testing the procedure entailed by his theories, and the way in which British residents in India, especially the officers of the army and the medical officers, offered themselves as subjects for the treatment, greatly encouraged the natives to follow suit. It was not long before some trustworthy evidence as to the practical value of the work was forthcoming, but opportunities for testing rigorously large populations were infrequent (fortunately), and for some time it was difficult to decide on the merits of the procedure. However, in the course of five years, a good number of authoritative reports came to hand, pointing to the efficacy of inoculation in reducing both the attack rate and the case mortality of the disease.

In 1896 the disastrous epidemic of plague in India led the Government to entrust Haffkine with the preparation of a vaccine against that disease, in view of his discoveries with vaccine as a preventive of cholera. The work was immediately commenced, and its results and extension were regularly reviewed in the medical and scientific press. In 1900 the Indian Plague Commission reported thoroughly on the whole matter, found that the use of the vaccine was attended with a diminution of the attack- and death-rates, and the establishment of a temporary protection, while the final recommendation of the Commissioners was that, under safeguards and in conditions of accurate standardisation and absolute care, the procedure should be encouraged wherever possible, and in particular among disinfecting staffs and the attendants of plague hospitals. A series of fatalities occurred in 1902 which for the time cast a suspicion upon the methods of manufacture of the prophylactic, but inquiry into the actual incidents made it clear that the tragedies were due, not to carelessness in the laboratory, but to a gross neglect of ordinary precautions in administration. That the activity of the Indian authorities in proceeding without break in inoculation against plague on a large scale was in no way unabated can be seen by the results of 30,000 cases of inoculation which were published in THE LANCET shortly afterwards. The review of these cases by Dr. C. P. Forsythe, who had been employed by the Punjab Government in carrying out a large scheme of inoculation, was published in THE LANCET at the end of 1903, and indicates well the difficulty in arriving at reliable statistics in India. The fact of disease, the diagnosis, and the fact of death, all had to be left to village registrars, and although the lists under the first and last headings were probably accurate, proof of the identity of the condition with plague was not always forthcoming, though the lists must have been substantially correct here owing alike to the obvious nature of the symptoms and the familiarity of the registrars with them. But although inoculation proceeded, Haffkine's control of the work had been suspended by the India Office, and he remained unemployed until he received through that Office a communication from the Secretary of State recording a view favourable to him of the origin of the Mulkoval disaster and offering him terms of employment in India. These were immediately accepted. The sufferer in a prolonged dispute who obtains a verdict in the end is never repaid for his anxiety, but throughout his period of trial Haffkine bore himself with the greatest dignity; he received many congratulations upon the recognition which he finally received from the India Office and upon his resolution to return to India. To-day the verdict on Haffkine's labours which is generally accepted is that the vaccine, when used in an epidemic, tends to reduce mortality by 85 per cent. What this means when we consider the millions of doses that were issued in India can hardly be conceived.

Until 1915 Haffkine remained as director-in-chief and officer in charge of the Biological Laboratory at Calcutta, when he resigned and took up his residence in Paris.

Sir Walter Fletcher has supplied the following interesting note: "The last direct service Haffkine gave to this country was in the late months of 1915. At that time 90 per cent. of the British Forces in Flanders and France had voluntarily received protective inoculation against typhoid infections, but no paratyphoid protection had been available for them.

[1] See THE LANCET, Feb. 11th, 1893, p. 307 et seq.; p. 316 et seq.

Meanwhile, part of the Forces in the Mediterranean had had the advantage of combined protection against typhoid, paratyphoid A, and paratyphoid B. In view of the entry of troops from India into France and the transference of divisions from the Mediterranean to the western fighting areas, it was increasingly urged that "A" and "B" vaccine should be added to the "T" already supplied to the Forces in France. Sir William Leishman, then Director of Pathology to the Expeditionary Force, had opposed immediate action on the ground that the inoculation reactions, if made more severe, might impede the swiftness of military reinforcements and movements in the field, and might disturb the statistical collection of results in France which were still needed for scientific, military, and political reasons. Sir Alfred Keogh recalled Leishman on short leave from France, where he had been immersed since the outbreak of war in his great work for the Expeditionary Force, and appointed him to a Committee under the chairmanship of Sir David Bruce, of which the other members were Captain (now Sir Frederick) Andrewes, Lieut.-Colonel (now Sir Andrew) Balfour, and myself. The Committee met at Millbank on Nov. 15th, 1917. The evidence supplied by Captain Andrewes and Colonel Balfour was supplemented by that of Colonel (now Major-General) David Harvey and Prof. Dreyer, while Dr. Haffkine by historic right came as a kind of neutral assessor. Leishman was convinced by the evidence brought before him and the arguments based upon it, and agreed to the immediate use of T.A.B. vaccine for the Forces in France and all other areas, if, in an experiment, the use of the triple vaccine in given dosage for 300 men at Millbank produced no undue reactions. In my opinion, this was in great measure due to the quiet influence of Haffkine, who strongly supported the views represented by Andrewes and Balfour. I made a report of this meeting to the Director-General, changing the word "experiment" into the word "trial." He accepted it, the trial was arranged at once, and the new T.A.B. vaccine was first issued for use in all areas in January, 1916. Haffkine had, of course, always been a great name to me, but I never met him except within that hour in which he gave this last service."

Haffkine received the C.I.E. in 1917, and thereafter lived in such retirement that some few years later the Indian Government were trying to locate him. But in 1925 his name came before the public in a manner that must have been extremely gratifying to him, for in that year, by a resolution of the Government of Bombay, the name of the Bacteriological Laboratory at Bombay was definitely changed to the Haffkine Institute, and with universal approval.

The close of Haffkine's life was spent on the continent. He accepted membership of various English, French, American, and Indian associations, and made contributions to Russian, French, and Dutch periodicals. His literary output was mostly confined to the studies in which he had spent his life, but he became also deeply interested in Jewish racial and religious questions. He was unmarried.

MEDICAL NEWS

Royal Colleges of Physicians of London and Surgeons of England.

AT the Final Examination of the Conjoint Board held from Sept. 30th to Oct. 22nd, the following candidates were approved in the subjects indicated, but are not eligible for the diplomas of the Colleges:—

Pathology.—J. S. Barker and R. J. V. Battle, Cambridge and St. Thomas's; Jessie G. Belilios, King's Coll.; C. M. Bell, St. Bart.'s; W. D. Bell, Cambridge and St. Bart.'s; G. F. Benjamin, Liverpool; C. C. Beresford, London; J. F. E. Bloss, St Thomas's; Doris Boon, Royal Free; W. H. Bradbeer, Guy's; A. I. P. Brown, London; N. P. Bruce, Charing Cross; A. M. Cantor, Guy's; E. F. Claridge and A. J. P. Coetzee, London; H. A. Constable, Guy's; G. T. Cook, Cambridge and King's Coll.; R. D. Darley, Univ. Coll.; J. O. F. Davies, Middlesex; B. Fine, London; J. Finer, Middlesex; A. C. Frazer, St. Mary's; L. Freeman, St. Bart.'s; R. J. Furlong, St. Thomas's; J. R. Gilmour, London; J. T. Griffiths, Univ. Coll.; E. B. Grogono, London; G. W. Hall-Smith, Cambridge and Guy's; D. C. Harris, Middlesex; G. F. C. Harvey, Manchester; F. J. V. Jaensch, St. Bart.'s; J. L. S. James, Bristol; N. M. James, King's Coll.; J. E. Jenkyn-Thomas, Cambridge and St. Bart.'s; C. D. P. Jones and Henrica A. Kellgren, Univ. Coll.; G. D. Kersley, Cambridge and St. Bart.'s; N. R. C. Lansdell, King's Coll.; R. A. Q. Lay, Guy's; C. H. Levick, Sheffield; D. L. Lewis, Cambridge and St. George's; D. T. Lewis, St. Mary's; W. F. McGladdery and R. M. Marshall, St. Bart.'s; Halle Marsten, Charing Cross; R. W. Maxwell, Univ. Coll.; W. J. Morris, Liverpool; I. Moshinsky, Guy's; G. G. Mowat, Cambridge and St. Thomas's; D. H. Murphy, Sheffield; R. W. C. Murray, Cambridge and Birmingham; J. E. A. O'Connell, St. Bart.'s; C. E. S. Oxley, St. Thomas's; H. C. Pickering, London; Doris Rees, Royal Free; E. T. Renbom, St. Bart.'s; C. H. Rogerson and C. Rutter, Guy's; A. G. Sanders, St. Thomas's; Mary A. Saunders, King's Coll.; E. Sharp, Guy's; D. A. Smith, St. Bart.'s; J. H. Spence, St. Thomas's; A. M. Stewart-Wallace, Univ. Coll.; D. Stone, Guy's; N. V. Storr, St. Thomas's; R. A. Sykes and M. Westwood, Cambridge and St. Bart.'s; E. W. M. Williams, Guy's; Mary J. Wilmers, King's Coll.; and R. B. D. Wright, St. Mary's.

Medicine.—Margaret Abernethy, Royal Free; E. S. Asiedu Ofei, Birmingham; Gwendolen E. Austin, King's Coll.; Margaret H. Banks, Royal Free; N. J. Bee, London; A. R. Clarke, Guy's; P. Cohen, St. Bart.'s; F. Cort and S. T. Cowan, Manchester; R. P. Dalal, M.B., Bombay; R. R. Davies, Univ. Coll.; G. G. M. Edelsten, St. Bart.'s; B. E. Fernando, L.M.S., Middlesex; Lena Finkelstein, Charing Cross; D. G. Gower, Cambridge and Westminster; R. W. Graham-Campbell, Cambridge and St. Bart.'s; E. W. Hardman, Manchester; Joan E. Harwood, Charing Cross; J. R. Heming, St. Thomas's; Blaguigna Illitch, Royal Free; Esther P. W. Jones, Charing Cross; B. W. Knight, St. Bart.'s; R. F. Legge, M.D., McGill; Ethelberta M. Lynton-Low, Royal Free; I. More, Univ. Coll.; W. H. Mylechreest, Cambridge and St. Thomas's; Emilata Nawalkishore, M.B., Royal Free; S. Rajapaksa, King's Coll.; E. T. Renbom, St. Bart.'s; G. J. Roberts, M.B., Edinburgh; H. W. Rodgers, St. Bart.'s; R. H. D. Short, Univ. Coll.; H. Simpson, Manchester; R. B. Sutcliffe, Guy's; Jessie A. Thirtle, Royal Free; R. L. H. Townsend, London; D. Trimble, Birmingham; R. S. Wale, King's Coll.; J. H. Way, Leeds; J. L. Wild, Cambridge and St. Thomas's; and Mary J. Wilmers and W. G. Wright, King's Coll.

Surgery.—R. C. Abel, Univ. Coll.; A. T. Andreasen, St. Bart.'s; W. Aukin, Univ. Coll.; S. Barigrasser, St. Bart.'s; H. B. Barker, St. Mary's; A. J. W. Beard, St. Bart.'s; C. E. Bevan, Cambridge and St. George's; K. Biden-Steele and E. T. Blacklee, Guy's; M. Blashka, Charing Cross; J. F. E. Bloss, St. Thomas's; A. D. Bourne, St. Mary's; G. D. S. Briggs, St. Bart.'s; H. Canwarden, St. Mary's; L. P. B. Chamberlain, St. Bart.'s; J. M. P. Clark, Leeds; J. L. S. Coulter, Bristol; I. Culank, Middlesex; G. J. Cunningham, St. Bart.'s; H. E. B. Curjel, St. Thomas's; A. Cursham, Cambridge and St. Thomas's; M. K. Cusack, St. Bart.'s; R. D. Darley, Univ. Coll.; D. M. Dean, St. Bart.'s; L. E. A. Dearberg, Guy's; G. A. Desai, L.M.S., Bombay and London; J. M. Erskine-Young, Liverpool; L. P. J. Evans, Cambridge and St. Bart.'s; Mary Evans, King's Coll.; B. E. Fernando, L.M.S., Middlesex; A. C. Fraser, Cambridge and St. Bart.'s; R. J. Furlong, St. Thomas's; L. T. Furnivall, St. Mary's; K. H. Gaskell, Cambridge and King's Coll.; W. F. T. George, St. Bart.'s; W. G. Glassco, McGill and St. Mary's; J. B. Great Rex, L. J. Hackett, H. T. Halper, and W. H. Hargreaves, St. Bart.'s; K. Harris, Guy's; F. T. J. Hobday, Cambridge and Bristol; G. M. Holliday, M.B., Leeds; G. Holroyd, Leeds and Guy's; E. E. R. Hopkin-James, Cambridge and Cardiff; D. T. Ishmael, St. Bart.'s; D. W. James, Guy's; E. Johnson, Manchester and Univ. Coll.; E. Jones, St. Thomas's; J. A. Kersley, Bristol; M. H. Khan, Durham; L. E. D. Knights, Middlesex; H. P. Lal, M.B., Edinburgh; N. Langdon-Down and C. S. Lewis, Cambridge and London; G. A. M. Lintott, Guy's; A. W. Littlewood, St. Mary's; G. G. Ludgater, London; J. O. McCarter, Manchester; A. P. McEldowney, Cambridge and St. Thomas's; R. W. McNabb, Guy's; S. F. Marshall, St. Bart.'s; R. H. Moore, Bristol; M. J. O'Donnell, L.D.S., Guy's; Angela M. S. A. Ofenheim, King's Coll.; H. J. C. Page, St. Mary's; H. C. Pickering, London; J. H. Pierre, St. Bart.'s; W. H. Poole, Cambridge and London; D. Y. Richardson, Durham; P. M. G. Russell, Univ. Coll.; P. G. Scott, Cambridge and St. Bart.'s; A. Shafi, M.B., Charing Cross; H. Silverberg, Middlesex; R. N. C. Smith, Guy's; L. R. C. South, London; H. W. G. Staunton, St. Bart.'s; A. B. Stokes, King's Coll.; N. V. Storr, St. Thomas's; J. W. Summerhayes, Cambridge and King's Coll.; G. Walker, London; R. G. Wilbond, Bristol; G. M. Willey, King's Coll.; R. N. H. Williams, Cambridge and St. Bart.'s; Mary Wills, Cardiff; D. Wilson, St. Mary's; and Edna M. Wilson, Charing Cross.

Midwifery.—R. E. Adam, St. Thomas's; Marjory Archer, Westminster; T. J. Ashley, Bristol and Cardiff; J. S. Barker,

Cambridge and St. Thomas's; J. S. Batchelor, New Zealand and Guy's; R. J. V. Battle, Cambridge and St. Thomas's; A. S. Baxi, Punjab; K. Baxter, Manchester; W. S. Baxter, St. Bart.'s; H. W. Benham, Univ. Coll.; C. C. Beresford, London; D. R. Bharucha, M.B., Bombay and St. Bart.'s; C. H. Blewett, Middlesex; H. Bloom, Guy's; M. Bloom, Manchester; H. W. Boake, Cambridge and St. Thomas's; J. D. Bright-Richards, Liverpool; A. I. P. Brown, London; Elizabeth C. M. Brunyate, Univ. Coll.; Joan Butterworth, Royal Free; A. B. Carter, Cambridge and St. Thomas's; P. H. Charlton, Middlesex; M. H. Churchill, St. Bart.'s; I. Cohen, King's Coll.; J. G. Connell, Cambridge and Sheffield; C. M. Connolly, St. Thomas's; F. Cort, Manchester; E. J. Currant, Cambridge and London; A. Cursham, Cambridge and St. Thomas's; F. M. Day, St. Mary's; D. M. Dean, St. Bart.'s; L. E. A. Dearberg, Guy's; J. R. Duffield, Cambridge and Westminster; K. V. Earle, Cambridge and St. Thomas's; E. St. J. C. Emerson, St. Mary's; D. Erskine, Guy's; L. P. J. Evans, Cambridge and St. Bart.'s; Mary Evans, King's Coll.; A. C. Frazer, St. Mary's; J. R. Gilmour, London; J. T. Griffiths, Univ. Coll.; E. B. Grogono, London; E. A. Gudgeon, St. George's; Hilary S. M. Hadaway and Kathleen M. L. Hall, Royal Free; H. T. Halper, St. Bart.'s; Elizabeth M. Handfield-Jones, Royal Free; D. C. Harris, Middlesex; Honor E. C. Harvey, Royal Free; D. S. Hayes, St. Bart.'s; L. C. Holland, Bristol; G. M. Holliday, Leeds; E. T. Hudson, Manchester; G. N. Humphreys, Cambridge and St. Mary's; W. Hunt, Cambridge and St. Bart.'s; B. Illitch, Royal Free; D. T. Ishmael, St. Bart.'s; A. L. Jacobs, Univ. Coll.; F. J. V. Jaensch, St. Bart.'s; C. D. P. Jones, Univ. Coll.; D. E. V. Jones, King's Coll.; Esther P. W. Jones, Cardiff and Charing Cross; I. O. Jones, Guy's; G. D. Kersley, Cambridge and St. Bart.'s; D. H. Klugman, Guy's; L. E. D. Knights, Middlesex; N. L. Lamb, Cardiff and Guy's; G. F. Lashmore, Guy's; C. H. Levick, Sheffield; C. S. Lewis, Cambridge and London; D. L. Lewis, Cambridge and St. George's; J. W. S. H. Lindahl, Cambridge and St. Thomas's; J. Littlejohn, St. George's; G. G. Ludgater, Cambridge and London; J. R. B. McBride, St. Bart.'s; A. B. MacEwan, Cambridge and London; G. J. McFarlane, St. Thomas's; S. A. MacKeith, St. Mary's; J. W. Macmillan, Cambridge and St. Thomas's; I. Magdi, M.B., Cairo; G. Malone-Lee, St. Thomas's; W. H. Mason, Middlesex; W. A. Mayne and T. P. Mulcahy, Cambridge and St. Thomas's; Lois M. Munro, Royal Free; D. Nagarajan, L.M.S., Madras; J. E. A. O'Connell, St. Bart.'s; Doris Onions, Leeds; Elizabeth S. G. Owen, Bristol; E. Palmer, Cambridge and King's Coll.; J. L. Parker and W. R. Parkes, Cambridge and St. Thomas's; C. G. Patel, M.B., Bombay; R. McI. Paton, St. Thomas's; M. R. Potter, Leeds; D. R. Prem, Bombay and King's Coll.; C. F. Price, Univ. Coll.; G. O. S. Reid, St. Mary's; G. J. Roberts, M.B., Cardiff and Edinburgh; N. L. Rusby, Oxford and St. Thomas's; D. N. Ryalls, Sheffield; I. N. Samuel and P. C. Sanyal, M.B., Middlesex; E. M. Sastry, Andhra; J. Scholefield, Leeds; P. G. Scott, Cambridge and St. Bart.'s; A. Segil, Guy's; J. H. Shakespeare, Cambridge and St. George's; E. G. Sibley and H. Silverberg, Middlesex; D. G. Snell and R. G. W. Southern, St. Thomas's; J. H. Spence, Cambridge and St. Thomas's; Gladys M. Spencer, Cambridge and King's Coll.; A. A. Screenivasan, Bombay and Charing Cross; F. R. Staub, Leeds; W. G. Stanford, Guy's; R. A. Sykes, Cambridge and St. Bart.'s; J. T. C. Taylor, St. Bart.'s; E. J. Walsham, St. Thomas's; A. R. Walters, Middlesex; E. D. Ward, Cambridge and St. Thomas's; M. Westwood, Cambridge and St. Bart.'s; J. C. Wharton, Guy's; G. A. W. Whitfield, Cambridge and Univ. Coll.; Eva M. M. Willett, Westminster; E. L. Williams, Univ. Coll.; V. F. F. Winslow, St. Bart.'s; and Dorothy Woodman, Royal Free.

University of Edinburgh.

On Oct. 25th, after the installation of Sir James Barrie, O.M., as Chancellor of the University, the following diplomas were conferred:—

D.P.H.—Katharine H. Aitchison, J. M. Davidson, Martha Keith, R. J. A. Lavoipierre, David Lees, I. F. Macleod, Barbara K. Nicholson (in absentia), Jean Sutherland, and Helen A. Wright.

University of London.

On the recommendation of the School Committee of University College Hospital Medical Board the Graham Scholarship in Pathology, for two years, has been conferred on Dr. C. L. Oakley. Mr. A. F. Watson, Ph.D., has been awarded the Laura de Saliceto studentship.

University of Aberdeen.

Dr. William Gilbert Evans has been appointed McRobert lecturer in malignant disease, and radium officer at Aberdeen Royal Infirmary. Dr. Evans is, at present, senior resident medical officer at Mount Vernon Hospital for Cancer.

College of Physicians of Philadelphia.

Alvarenga Prize.—The next award of this prize, amounting to about 300 dollars, will be made on July 14th, 1931. Essays on any subject in medicine will be considered, provided they have not appeared in print in any form, and have not been presented elsewhere in competition for a prize. They must be in prescribed form and must be received by the secretary of the College by May 1st.

The Alvarenga prize for 1930 has been awarded to Dr. Henry A. Harris, assistant professor of anatomy at University College, London, for an essay on Cod-liver Oil and the Vitamins in Relation to Bone Growth and Rickets.

Pharmaceutical Society of Great Britain.

At a meeting of this Society to be held at 17, Bloomsbury-square, London, W.C., at 8.30 P.M., on Tuesday, Nov. 18th, Mr. Wilfred H. Linnell, Ph.D., will lecture on the Purity, Standards, and Tests of Medicinal Substances.

Royal Sanitary Institute.

At the Field Laboratories, Milton-road, Cambridge, at 10.30 A.M. on Saturday, Nov. 15th, Prof. J. Basil Buxton, F.R.C.V.S., and the staff of the Department of Animal Pathology of the University, will give a demonstration on Recent Research in Connexion with Animal Tuberculosis.

Lectures on Diseases of Children.

A course of lecture-demonstrations on Diseases of Infancy and Childhood will be given at St. John's Hospital, Morden Hill, Lewisham (Station: Lewisham Junction), by Dr. John Gibbens, at 4.30 P.M. on alternate Mondays, from Nov. 3rd onwards. Practitioners, senior students, and nurses are invited to attend.

Congress of Military Medicine.

The Sixth International Congress of Military Medicine and Pharmacy will be held at The Hague from June 1st to 6th, 1931. The principal subjects will be: the recruitment and training of military doctors and pharmacists; the psychoneuroses of war; hæmostasis on the battlefield; the preparation and conservation of ampoules of drugs used in the services; the sequels of war trauma of the teeth and mandible. Further information is obtainable from the Director of Health Services of the Ministry of War at The Hague.

International Hospital Congress.

The second International Congress will be held at Vienna from June 8th to 13th, 1931. The subjects for discussion are hospital building costs, nursing, hospital terms and definitions, auxiliary hospital activities, hospital laws, cost of maintenance of patients, dispensaries, nutrition, effect of health insurance on hospital practice, and the place of neurology and psychiatry in the general hospital. British, Danish, and German hospitals will be visited before the Congress, and afterwards the members will go on to Budapest. Application should be made to Prof. Tandler, chief of the welfare and health service of the city, at 9, Rathausstrasse, Vienna.

Courses at Maudsley Hospital.

A course for candidates for a Diploma in Psychological Medicine will begin at the Maudsley Hospital, Denmark Hill, London, S.E., on Jan. 6th. The lecturers and demonstrators will be Dr. F. Golla, Capt. S. A. Mann, Prof. W. le Gros Clark, Mr. Charles Geary, Dr. Henry Devine, Dr. Edward Mapother, Sir Hubert Bond, Dr. J. S. Harris, Mr. R. Foster Moore, Dr. Bernard Hart, Dr. William Moodie, Dr. F. C. Shrubsall, and Dr. W. Norwood East. There will also be a concurrent series of clinical lectures as follows: six by Dr. Thomas Tennent on Nervous Disorders in Children; six by Dr. Aubrey Lewis on the Origin and Significance of Symptoms; and six by Dr. Mildred Creak on the Neuroses. Inquiries should be addressed to the Director of the Central Pathological Laboratory at the hospital.

Children's Hospital at Bexhill.

At Bexhill, on Oct. 22nd, the Duke of York opened an annexe at the Little Folks' Home at Little Common, the seaside branch of the Queen's Hospital for Children, of which he is president. The annexe is the gift of Sir James Carmichael, and provides additional wards for ten more children, increasing the available beds to 46. The Duke, in reply to an address, expressed his pleasure at being associated with another great act of generosity on the part of Sir James, and referred with gratitude to a gift of £500 from Mr. Philip Agnew to endow a bed in memory of his son, a former member of the hospital committee.

A National Maternity Service.

On Oct. 24th the Minister of Health received a deputation from the standing joint committee of the National Women's Organisation. The deputation, which was introduced by Miss Marion Phillips, M.P., urged the importance of early steps being taken by the Government to set up a national maternity service, and stressed the desirability of full control of such a service by the health authorities. The Minister said, in reply, that he proposed to approach local authorities immediately, and urge upon them the importance of an improvement and extension in their present maternity services. He also said that he intended to discuss with the local and other authorities affected, including the doctors and those concerned with health insurance, the question of a national scheme; but it had to be realised that these discussions would inevitably take time.

New Pharmacy Laboratories at Manchester.

The new Wooley Laboratories for Pharmaceutical Chemistry and Galenical Pharmacy at the University of Manchester were formally declared opened on Oct. 22nd. These laboratories have been equipped entirely by the Wooley family at a cost of £3000. Mr. Neathercoat, past president of the Pharmaceutical Society of Great Britain, in declaring the laboratories open, said he believed they were the best pharmaceutical laboratories in the country.

Dublin University Biological Association.

The annual opening meeting of this Association was held at Dublin on Oct. 25th, when Dr. Leonard Abrahamson, the President-Elect, gave an address on Some Recent Advances in Diseases of the Heart. He was followed by Dr. F. W. Price (London), who referred to the high position occupied by heart diseases in the statistics of mortality, stated that they were becoming more frequent, and expressed the opinion that the greater frequency was due to the strain of modern life. Prof. H. F. Moore, University College, Dublin, spoke at some length of the need for research in medicine in the Dublin school. He pointed out that, of all the great advances in clinical medicine in the last decade, not one of any magnitude had come from Ireland. The winning of a place among the free nations of the world brought with it certain moral responsibilities, and the organised study of disease was one of these. Discussing methods by which research might be financed, he suggested that of the funds which certain hospitals expected to receive as the result of sweepstakes, at least 5 per cent. might be earmarked to finance studies directed toward the discovery of better methods for the diagnosis and treatment of disease. He drew attention to some of the advantages of the Dublin methods of medical education, but put in a plea for greater coördination in clinical teaching, without, however, sacrificing individuality for too much standardisation. He mentioned the help that had already been given in Ireland by the Rockefeller Foundation, and suggested plans by which further assistance might be obtained. Prof. T. G. Moorhead, in proposing a further resolution, spoke of the advantage to the Association and to medical education in the University of Dublin which should result from the admission of women to the membership of the Association. He put in a caveat against too great reliance on elaborate apparatus in the diagnosis of heart disease, and maintained that the essentials of diagnosis were attainable by the four fundamental methods of inspection, palpation, percussion, and auscultation. Dr. D. E. Bedford (London) discussed various problems arising from heart disease, and in particular devoted attention to coronary thrombosis.

Medical Diary

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, Nov. 4th.—5 P.M., ORTHOPÆDICS. Presidential Address: Mr. Jenner Verrall: Some Amputation Problems. A discussion will follow. 8 P.M., PATHOLOGY: Laboratory Meeting at the Bland-Sutton Institute of Pathology, Middlesex Hospital, W. Demonstrations: J. McIntosh and R. W. Scarff: Some Factors in Antibody Production. L. E. H. Whitby: Anaerobic Infection of the Gall-bladder; *Sporotrix beurmanni*. A. C. Counsell: Odontomes. L. W. Proger and E. G. Muir: Pathological Specimens. D. H. Patey: The Histological Appearances of Some Tumours after Irradiation. S. L. Baker: Two New Transmissible Fowl Tumours. E. C. Dodds: Apparatus for the Determination of the Basal Metabolic Rate of Small Animals. F. Simer: Monometric Determination of the Respiratory Quotient on a Single Tissue Slice. (The last two demonstrations will be given at the Courtauld Institute of Biochemistry.)

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE AND ODONTOLOGY. Paper: Mr. F. N. Doubleday: History of Dentistry. 8.30 P.M., SURGERY. Presidential Address: Mr. C. H. Fagge: The Aims and Limitations of Surgery. A discussion will follow.

THURSDAY.—2 P.M., LARYNGOLOGY. A Cinematographic Demonstration will be given by Dr. Eastman Sheehan (U.S.A.) on Plastic Operations on the Face, at which members of the Section of Surgery are specially invited to be present. Illustrative cases will be shown by Sir Harold Gillies during this demonstration. 5 P.M., SEMON LECTURE: Mr. V. E. Negus: Some Observations on Semon's Law. 8 P.M., TROPICAL DISEASES. Dr. E. C. Smith (Nigeria): Cultivation of the Spirochætes Associated with Tropical Ulcer.

FRIDAY.—10.30 A.M., OTOLOGY. (Cases at 9.30 A.M.) Presidential Address by Mr. Alexander R. Tweedie. Dr. Dan McKenzie: The Pathogenesis of Cholesteatoma. The paper will be discussed by Mr. C. Heath, Mr. Lowndes Yates, and others. Cases and Specimens will be shown by Dr. Dan McKenzie, Mr. Graham Brown, Mr. E. Broughton Barnes, and others. 5 P.M., LARYNGOLOGY. (Cases at 4 P.M.) A discussion will be held on Precancerous Conditions of the Larynx, in which it is hoped Dr. Chevalier Jackson (U.S.A.) will take part. Cases and Specimens will be shown relating to the subject under discussion. 8.30 P.M., ANÆSTHETICS. Presidential Address: Dr. H. W. Featherstone: A Visit to Some of the Hospitals in Canada and the Mayo Clinic. A discussion will follow.

ROYAL INSTITUTION, 21, Albemarle-street, W.

TUESDAY, Nov. 4th.—5.15 P.M., Mr. C. D. Ellis, F.R.S.: Aspects of Radio-activity.

THURSDAY.—5.15 P.M., Prof. J. B. Haldane: Physiology of Water.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.

TUESDAY, Nov. 4th.—5 P.M., Dr. W. E. Hume: Paroxysmal Tachycardia. (Bradshaw Lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

MONDAY, Nov. 3rd.—5 P.M., Dr. D. H. Patey: Demonstration of Specimens Illustrating the Pathological Conditions of the Salivary Glands.

THURSDAY.—5 P.M., Prof. G. E. Gask: Vicary's Predecessors. (Thomas Vicary Lecture.)

FRIDAY.—5 P.M., Sir Arthur Keith: Demonstrations of Specimens of Surgical Interest Recently Added to the Museum.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Nov. 3rd, to SATURDAY, Nov. 8th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Mon., 4 P.M., free lecture by Dr. B. T. Parsons-Smith on Recent Advances in the Diagnosis and Treatment of Coronary Thrombosis. Special M.R.C.P. Lectures at 8.30 P.M.: Tues., Dr. Maurice Cassidy: Auricular Fibrillation: Fri., Dr. O. L. V. de Wesselow: Uræmia.—ST. JOHN'S HOSPITAL, Leicester-square. Mon., 2 P.M., free demonstration in the Out-patient Dept. by Dr. W. Griffith.—METROPOLITAN HOSPITAL, Kingsland-road, E. Tues., 2 P.M., free demonstrations by Dr. J. W. Linnell (Ward Round) and Mr. R. J. McNeill Love (Out-patient Dept.).—LONDON LOCK HOSPITAL, Dean-street, W. Four weeks' special course in Venereal Disease, occupying afternoons and evenings.—HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C. Second week of post-graduate course in Diseases of Children.—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Broad-street, W.C. Afternoon course in Ophthalmology. Further particulars from the Fellowship of Medicine.

KING'S COLLEGE, Strand, W.C.

THURSDAY, Nov. 6th.—5 P.M., Mr. J. A. Hewitt, Ph.D.: Metabolism of the Carbohydrates and Fats. (Last of four free lectures.)

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.

THURSDAY, Nov. 6th.—9 P.M., Dr. R. D. Lawrence: Simplicity in the Treatment of Diabetes.

UNIVERSITY COLLEGE, Gower-street, W.C.

MONDAY, Nov. 3rd.—5 P.M., Dr. H. P. Gilding: The Reticulo-endothelial System. (Last of four free lectures.)

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham, S.W.

THURSDAY, Nov. 6th.—4 P.M., Dr. H. Gardiner-Hill: Uses and Abuses of Endocrine Therapy.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, Nov. 5th.—4.30 P.M., Mr. Frank Kidd: Some Elementary Principles in Urology.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY, Nov. 7th.—4 P.M., Mr. F. W. Watkyn-Thomas: Ménière's Disease.

ST. JOHN'S HOSPITAL, Morden Hill, Lewisham.

MONDAY, Nov. 3rd.—4.30 P.M., Dr. John Gibbons: Demonstrations of Cases of Disease of the Lungs in Infancy and Childhood.

ROYAL NORTHERN HOSPITAL, Holloway-road, W.

TUESDAY, Nov. 4th.—3.15 P.M., Mr. L. E. Barrington-Ward: Demonstration of Surgical Cases.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY, Nov. 3rd.—12 noon, Dr. Greenfield: Inflammation of the Central Nervous System. 2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Purdon Martin: Neurosyphilis.

TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Symonds: Cerebral Abscess.

WEDNESDAY.—2 P.M., Dr. Martin: Out-patient Clinic.

THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Mr. Just: The Vestibular Apparatus.

FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. Carmichael: Meningitis.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Nov. 3rd.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose, and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Throat, and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Ear, Nose, and Throat Clinics. 2.30 to 5 P.M.: Medical, Surgical, and Children's Diseases Clinics. Operations.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Nov. 4th.—5 P.M., Dr. H. MacCormac: Diseases Due to Animal Parasites.
THURSDAY.—5 P.M., Dr. W. J. O'Donovan: Occupational Dermatitis.

THE HALLEY STEWART TRUST.
TUESDAY, Nov. 4th, and the following THURSDAY.—6 P.M. (in the Memorial Hall, Farringdon-street, E.C.), Sir George Newman: How England Learned to Control Disease, and Health Problems of the Modern Period, respectively. (First two of four free lectures on Health and Social Evolution.)

INSTITUTE OF HYGIENE, 28, Portland-place, W.
WEDNESDAY, Nov. 5th.—3.30 P.M., Lady Barrett: Maternal Mortality.

CHADWICK PUBLIC LECTURES.
THURSDAY, Nov. 6th.—5.15 P.M. (in the Hastings Hall, B.M.A. House, Tavistock-square, W.C.), Dr. Matthew Ray: Rheumatism. Treatment.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Nov. 5th.—4 P.M., Prof. S. L. Cummins: Prevention of Tuberculosis.
THURSDAY.—4 P.M., Mrs. Marie Stopes, D.Sc.: History and Theory of Contraceptive Technique.

ANCOATS HOSPITAL, Manchester.
THURSDAY, Nov. 6th.—11 A.M., Mr. H. Platt: Clinical Demonstration. 4.15 P.M., Dr. Catherine Chisholm: Digestive Difficulties in Infancy.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, Nov. 4th.—4.15 P.M., Mr. P. R. Wrigley: Calculi.
FRIDAY.—4.15 P.M., Lloyd Roberts Lecture at the University. Right Rev. E. W. Barnes, Bishop of Birmingham: Heredity and Predestination.

Appointments

CLEMENTS, A. E., L.R.C.P. and L.R.C.S.I., has been appointed Medical Officer of Health, Irvenstown District, Fermanagh.
HOLMES, J. G., M.B., Ch.B.N.U.I., Surgeon to St. John's Hospital, Limerick.
LEVICK, H. D., M.B., B.S.Lond., Medical Referee under the Workmen's Compensation Act for Middlesbrough, &c.
Certifying Surgeons under the Factory and Workshop Acts: TREMLOW, W. A. F., L.R.C.P. Lond., M.R.C.S. (Flint); WIGHT, A. (Stoveley, Westmorland).

Vacancies

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road, E.—Asst. Surg.
Banbury, Oxon, Horton General Hospital.—Res. M.O. At rate of £150.
Bangor, Caernarvonshire and Anglesey Infirmary.—H.S. £200.
Bath, Royal United Hospital.—Two Hon. Surg.'s.
Birmingham, Dudley-road and Selly Oak Hospitals.—Asst. Pathologist. £500.
Birmingham, Ear and Throat Hospital, Edmund-street.—4th H.S. to Out-patient Dept. £150.
Birmingham, Selly Oak Hospital.—Surgeon. £700.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £150.
Brighton, Lady Chichester Hospital.—Jun. and Sen. H.P.'s. At rate of £50 and £100 respectively.
Brighton, Royal Sussex County Hospital.—Asst. Pathologist to Special Depts. £400.
Burnley, Victoria Hospital.—H.P. At rate of £150.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency Officer. At rate of £130.
Charing Cross Hospital, W.C.—Res. M.O. £350.
Children's Hospital, Hampstead.—Res. M.O. At rate of £100.
Connaught Hospital, Orford-road, E.—Res. H.S. At rate of £100. Also Hon. Visiting Dental Surgeon.
Coventry and Warwickshire Hospital.—Res. Asst. H.S. £125.
Durham County Mental Hospital.—2nd H.S. £150.
East Ham Memorial Hospital, E.—Hon. Surg., Hon. Phys. Also Hon. Radiologist.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—Asst. Physician.
Elizabeth Garrett Anderson Hospital, Euston-road,—H.P., Obstet. Asst., three H.S.'s. Each at rate of £50. Also Clin. Assts.
Exeter, Royal Devon and Exeter Hospital.—H.P. At rate of £150.
Great Yarmouth General Hospital.—Jun. H.S. At rate of £140.
Guildford, Royal Surrey County Hospital.—Asst. Pathologist. £500.
Hampstead General and North West London Hospital, Haverstock-hill, N.W.—Cas. M.O. At rate of £100.
Hastings, Royal East Sussex Hospital.—Sen. and Jun. H.S. At rate of £150 and £100 respectively.
Heston and Isleworth Urban District Council.—Obstet. Phys. 3 guineas per session.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—Asst. in Dept. of Pathology. £350.
Hospital for Sick Children, Great Ormond-street, W.C.—Dental Surgeon.
Huddersfield, County Borough of.—Asst. M.O.H. £500.
Hull, Beverley-road Institution.—Asst. M.O. £300.
Hull Royal Infirmary.—Asst. H.P. At rate of £130.
Indian Red Cross Society, King George Thanksgiving (Anti-Tuberculosis) Fund.—Organising Secretary. Rs.750–1250 per month.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. £120.
Leeds Hospital for Women.—Hon. Asst. Surg.
Liverpool and District Hospital for Diseases of the Heart.—H.P. £100.
London Jewish Hospital, Stepney Green, E.—Res. M.O., and Cas. O. Each at rate of £150. Also Jun. Res. M.O. At rate of £100.
Lowestoft, St. Luke's Hospital.—Jun. Asst. M.O. £500.
Manchester, Ancoats Hospital.—Orthopædic H.S. At rate of £100.
Manchester and Salford Hospital for Skin Diseases.—H.S. At rate of £100.
Manchester Royal Infirmary.—Dickinson Research Travelling Scholarship in Medicine. £300.
Margate Borough.—M.O.H., &c. £900.
Metropolitan Hospital, Kingsland-road, E.—Surg. to Ear, Nose, and Throat Dept.
Middlesbrough Education Committee.—Sen. Asst. School M.O. £500.
Newcastle-upon-Tyne Hospital for Sick Children.—Jun. H.S. Res. Sen. H.S. At rate of £100 and £95 respectively. Also Res. H.P. At rate of £95.
Northampton County Mental Hospital, Berrywood.—Jun. Asst. M.O. £350.
Northamptonshire County Council Education Committee.—Asst. School M.O. £500.
Northwood, Middlesex, Mount Vernon Hospital.—Res. M.O. £300.
Nuneaton General Hospital.—H.S. At rate of £120.
Oswestry, Shropshire Orthopædic Hospital and Agnes Hunt Surgical Home.—Two H.S.'s. Each at rate of £200.
Preston County Borough.—Asst. School M.O. £600.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, N. Kensington.—H.P. At rate of £100.
Queen's Hospital for Children, Hackney-road, E.—H.S. Cas. O. Also H.P. All at rate of £100.
Royal Northern Hospital, Holloway, N.—H.S. At rate of £70.
St. Andrew's Hospital, Dollis Hill, N.W.—Jun. Res. M.O.
St. Bartholomew's Hospital.—Two Chief Assts. to Dental Dept.
Sheffield Royal Hospital.—Ophth. H.S. At rate of £80.
South London Hospital for Women, Clapham Common, S.W.—Clin. Assts. to Special Depts.
Stockport Corporation's Maternity Hospitals.—Consultant Obstetrician.
Stockport Infirmary.—H.P. £175.
Truro, Cornwall Education Authority.—School Dental Surgeons. Each £500.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
Warrington Infirmary and Dispensary.—Anæsthetist. £150 for a rota of 2 or 3.
West Riding of Yorkshire C.C.—Asst. Bacteriologist. £500.
Wigan Royal Infirmary.—H.S. At rate of £150.
Willesden General Hospital, N.W.—H.P. £100.
Willesden Urban District Council.—Asst. M.O. £600.
Wolverhampton Royal Hospital.—H.S. At rate of £150.
Woolwich and District War Memorial Hospital, Shooters-hill, S.E.—H.S. £100.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Llandyssil (Cardiganshire).

Births, Marriages, and Deaths

BIRTHS.

BULL.—On Oct. 23rd, at Kingsthorpe, Northampton, the wife of Dr. A. G. Bull, of a son.
CARSON.—On Oct. 17th, the wife of Hugh Carson, M.B., B.Ch., The Hospital, Selly Oak, Birmingham, of a son.
GOFFE.—On Oct. 25th, at The Red House, Kingston Hill, Surrey, the wife of E. G. Leopold Goffe, M.D., B.S.Lond., of a son.
MILNE.—On Oct. 8th, at the McRobert Hospital, Cawnpore, U.P., India, to Dr. and Mrs. C. G. S. Milne—a son.
TOWNSEND.—On Oct. 21st, at Thorley Lodge, Yarmouth, I.W., the wife of Major E. M. Townsend, *M.C.*, R.A.M.C., of a daughter.
WILSON.—On Oct. 23rd, the wife of W. Etherington Wilson, F.R.C.S., of Hillsborough, Torquay, of a daughter.

MARRIAGES.

AYKROYD—BUTTERY.—On Oct. 18th, at the Church of the Annunciation, W., Wallace Ruddell Aykroyd, M.D., to Freda Kathleen, youngest daughter of Mr. H. Buttery, Potchefstroom, Transvaal.
WOOD—ENGLAND.—On Oct. 25th, at St. Augustine's, Edgbaston, Gordon Nesbitt Wood, M.R.C.S., to Cordelia Helen England, M.R.C.S., eldest daughter of Mr. E. T. England, King Edward's School, Birmingham, and Mrs. England.

DEATHS.

DAVIES.—On Oct. 16th, suddenly, at a nursing-home in Bournemouth, Gwilym Tremain Davies, L.D.S.R.C.S., late of New Cavendish-street, London, aged 41.
DOUGHTY.—On Oct. 19th, suddenly, at Woodside, Bearsted, Kent, William Doughty, L.R.C.S., L.R.C.P., aged 80.
HAFFKINE.—On Oct. 26th, at Lausanne, Prof. Waldemar Mordecai Wolff Haffkine, C.I.E., Bacteriologist with the Government of India (retired), aged 70.
REID.—On Oct. 20th, at West Kent Hospital, Maidstone, Edward Douglas Whitehead Reid, M.B., B.Ch., aged 47.
ROBERTS.—On Oct. 22nd, Sidney Morton Pearson Roberts, J.P., M.R.C.S., of The Gables, Linslade, Leighton Buzzard, Bucks., aged 70.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

A CONFERENCE ON MATERNAL MORTALITY.

THE fifth Conference of the Committee on Maternal Mortality was held at Friends House on Oct. 27th, under the presidency of the Duchess of Atholl. Referring to the recommendations of the Departmental Committee in its interim report, she said that a great part of the provision regarded as necessary already existed in many areas; even in rural districts 82 per cent. of the population were now within reach of a trained midwife, district nursing associations being largely responsible for this service. There was ground for confidence that the direction had been shown by which, with the coöperation of the conscience and intelligence of the public, we might find a way in which one of the greatest experiences of life might come to be regarded as something natural, normal, and not fraught with serious danger.

THE MINISTER OF HEALTH.

Mr. Arthur Greenwood spoke of the unreduced maternal mortality-rate as one of the black marks against the health services of our country, for nobody could be satisfied with deaths and disease resulting from preventable causes, as about half the 2000 deaths investigated by the Departmental Committee had been pronounced to be. The first line of attack he believed was to induce local authorities to use to the full the powers already possessed by them. If all local authorities used their powers up to 100 per cent., a marked impression might be made on the maternal death-rate. There were, however, areas in which antenatal care was provided, and only a minority of pregnant women took advantage of it; the best facilities for skilled attention were valueless unless the women could be educated to make use of them. Many committees had produced as many reports calling for the establishment of a national maternity service, but Mr. Greenwood had not yet met anybody who knew exactly what it meant. He had not got a scheme to put before the meeting, but he had an objective—that of a national maternity service fulfilling the principles laid down in the report. Details could only be formulated when they came to the stage of negotiations, and it would render no useful service to be too specific before counsel had been taken as to how the suggestions could be most effectively carried out. He would like to forge a bond of partnership between the National Health Insurance scheme and the local authorities, which he believed was the only satisfactory basis on which a national service could be established.

A NON-PARTY RESOLUTION.

Lady Erleigh moved a resolution emphasising the agreement of the Conference with the recommendations of the Departmental Committee's report, especially in its demand for an increase in the length and content of training of medical students in obstetrics, and in its five points as to the essential services necessary. On the proposal of Mrs. Cranley, seconded by Mrs. Malone, it was agreed to add home helps to the list of ancillary services desirable.

Miss Marion Phillips, D.Sc., seconded the resolution, and spoke of the grave responsibility of continuing to pile up a toll of preventable deaths while we failed to provide the care which might prevent them. She knew a scheme could not be produced in a night, but she suggested that the Minister of Health should set himself a mental time limit for carrying out negotiations with all those concerned. There was real need for haste, though a great deal might be done without waiting for the national scheme to be completed.

Dr. H. B. Brackenbury, chairman of the Council of the British Medical Association, said that the resolution had the support of the medical profession. It was that profession which had first formulated a definite maternity scheme, and all the schemes proposed had been largely in agreement as to the requirements. It was important to continue education and agitation, so that whatever Government was in power the necessity to do something in this matter might be kept prominently in mind. Although it might be wise to urge the putting into force of existing powers, and although the moment might not be favourable for a large expenditure on a new social service, yet the complete national maternity scheme must be kept in view, and no temporary measure must be allowed to interfere with or materially to delay the full scheme.

Discussion was carried on to the extreme time limit, after which the resolution was put to the meeting and carried unanimously.

A PLEA FOR SYMPATHY WITH THE DEAF.

Mr. Stanley Baldwin, at the annual meeting of the National Institute for Promoting the Welfare of the Deaf, last May, pointed out that the disabilities of the deaf are considerably aggravated by lack of sympathy on the part of those with whom they come into contact, a fault which often arises from want of thought and want of imagination. Much might be done to mitigate this unfortunate condition of things if the matter were ventilated in the public press, and it was gratifying to see that the *Sunday Graphic* of October 26th contained an article on the subject, written by "One who is Deaf." After enumerating some of those things which make life so difficult for the deaf, but which could easily be avoided if the public understood, the writer closes with the words "Do not laugh at our mistakes. Try to lighten our burden of deafness. We ask you only for the same sympathy and understanding which you instinctively give to the blind." This is a plea which surely will not be disregarded when once the public understand the position of these afflicted people.

"THE THREE CARD TRICK."

HOLBORN Borough Council has recently opened a centre to test the liability of children to diphtheria infection by Schick's method, and to immunise artificially those in whom the test is positive; in addition they have set out the dangers of the disease and the value of the remedy by means of a short propaganda film called "The Three Card Trick." The film opens with scenes on the racecourse and fair-ground where exponents of the art of card-sharping encourage their audience to "spot the lady." From this mysterious beginning the scene shifts to the site of the Foundling Hospital, where a crowd of children are seen at play; the high incidence of diphtheria, the dangers of infection by carriers, and the method by which children are rendered immune are described in simple headlines. The new centre at 10, John-street, Theobald's-road, is shown in action, and the mildness of the test is illustrated by the tranquillity of several small children under the operation. The popularity of the centre is already increasing rapidly.

In a slightly morbid epilogue the allegory of the title is explained; instead of a memorial card as the sole memento of a daughter dead of diphtheria, the wedding card of a living young woman might have appeared in later years, had the mother taken her to the immunisation centre as a small child. In this case the "winning card" is signed by the mayor for each child certified immune to diphtheria. The film is available for hire by other boroughs where it may be required for propaganda purposes.

NEW HOSPITAL FOR THE POTTERIES.—Lord and Lady Harrowby last week opened the new Burslem, Haywood, and Tunstall war memorial hospital at Stanfield, Burslem, the successor of the old Haywood Hospital. The hospital, which contains 68 beds, has cost £43,000, of which £6000 remains to be raised.